FOR
BETTER MANAGEMENT
OF
PLANT OPERATIONS

FACTORY

august 1961

PRICE ONE DOLLAR

A McGRAW-HILL PUBLICATION

SECRETARY HODGES TALKS TO PLANT MEN
p. 62

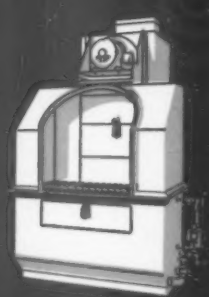
THE LONELY SUPERVISOR
p. 88

THE PERILS OF DEFENSE CONTRACTING
p. 92

COVER STORY
HALF-CENTURY PLANT IS BETTER THAN EVER
p. 72

UNI-WASH WET-TYPE
DUST COLLECTOR

UNI-WASH DUST COLLECTOR
WITH SLUDGE CONVEYOR



UNI-WASH DOWN-DRAFT
BENCH-TYPE

dust collectors

from DeVilbiss are your answer if you have a problem involving process dust. This Uni-Wash wet-type unit washes, scrubs, and fogs contaminants from the air stream during processing. Other types remove vapors, corrosive fumes, chips, dirt, sticky mists. DeVilbiss can build complete systems to your specifications—or furnish standard units ready for bolting to your floor.

Talk to DeVilbiss about all your process dust collection problems

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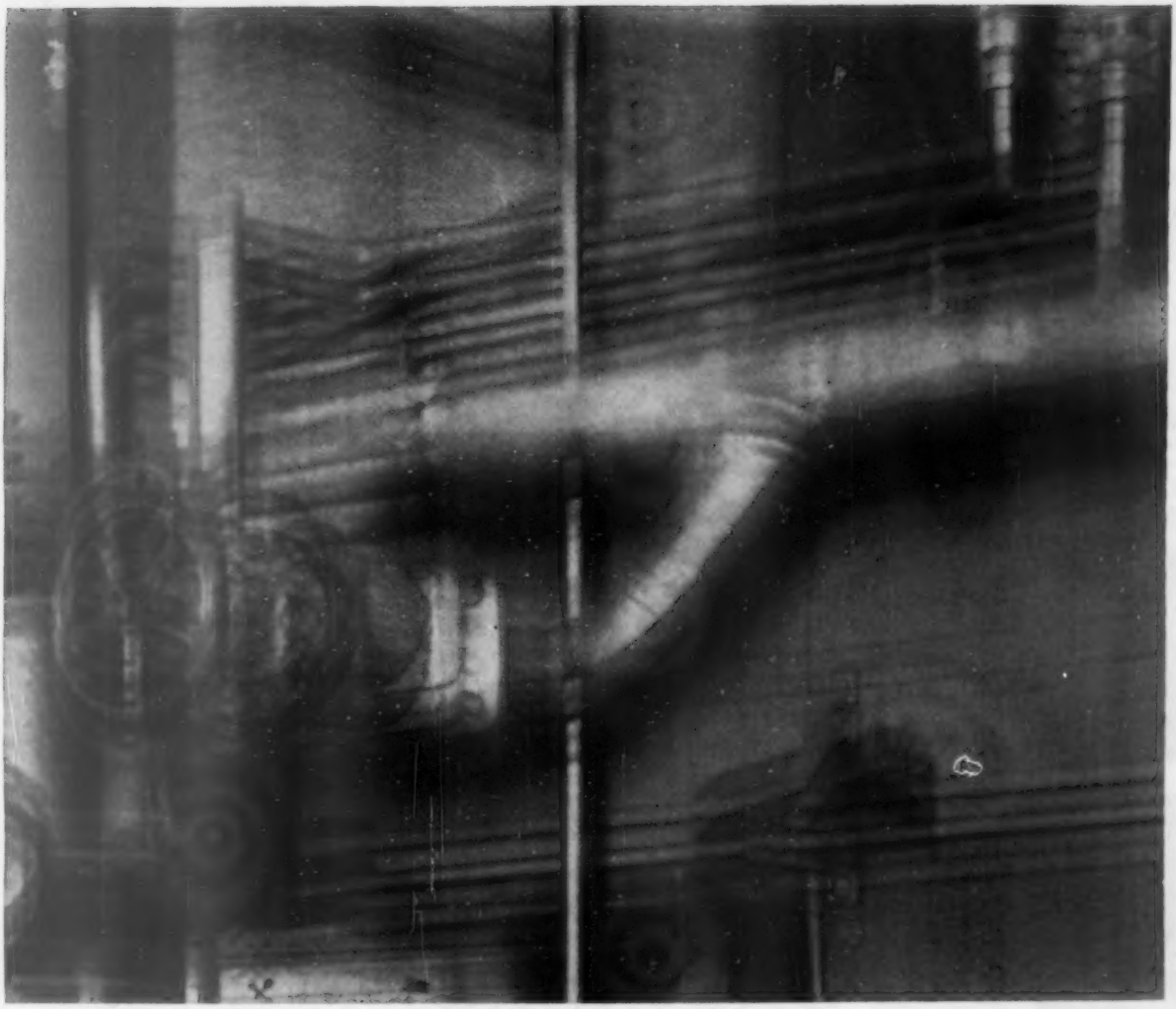
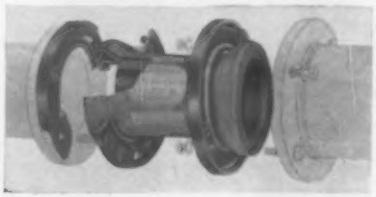
For more facts circle 404 on READER SERVICE CARD



Tranquilizers for pipes that shake like this

HERE'S a sure cure for pipes that get rattled when the pressure's on. Install a B.F.Goodrich connector between the pipe and the pump. A connector is a short length of rubber hose used to join sections of pipeline. The soft, thick rubber absorbs vibrations. Cuts out banging and noise. Increases pump life, avoids costly broken connections.



In a midwest zinc plant, pipe on a hot acid line had to be replaced 2 or 3 times a year. Vibration from the pump shook the pipe until it banged, rattled, cracked. Then a short length of the lead pipe was replaced with a BFG Flexseal connector. Its cost $105. And it saved the customer $1000 in the first year alone by eliminating the cause of broken connections, frequent repairs, costly pipe replacements.

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B.F.Goodrich distributors can give you complete details on B.F.Goodrich Flexseal and Flexlock connectors. And as factory-trained specialists in rubber products, they can answer your questions about any of the products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-143, Akron 18, Ohio.*

B.F.Goodrich

FOR BETTER
- PLANT MAINTENANCE & ENGINEERING
- PRODUCTION
- PLANT MANAGEMENT

AUGUST 1961

FACTORY

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FEATURES

Today's prophets of doom are wrong **62**
Secretary of Commerce Hodges tells why.

Spot the gaps in plant security **66**

To succeed with automatic control—think small **70**
A raft of concrete suggestions on where to begin.

COVER STORY—New life for an old workhorse **72**
Western Electric's biggest plant gets a thorough updating.

Indirect labor pay—nine more cities report **82**

Your plant's chance for fame **83**
The search begins for 1962's Top Ten plants.

Exotic metals do bread-and-butter jobs **84**

The millstone of indirect costs **87**
Special memo to FACTORY readers.

The lonely supervisor **88**
Who he is, why he is, how to help him.

Rate your plant housekeeping **90**

Clover-leaf bench layout saves testing time **91**
Calibration lab goes modern.

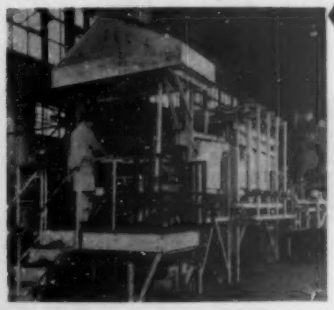
The dangerous business of defense contracts **92**
What you don't know will hurt you.

Conference in Japan spurs better maintenance **98**
PM becomes a byword in the Orient.

Four clever efficiency boosters **147**

No end to lift truck's use **190**

CASE BOOK p. 141



Automatic forging system speeds production and turns out almost mill-scale free parts at American Brake Shoe (page 142) . . . Here's a way to show your workers just what a strike will cost them in lost wages (page 144) . . . Fork truck rides on rails and solves aisle space problems at Kodak (page 148) . . . Electrostatic system with bells instead of disks paints multi-sized items on one line at Kelvinator (page 150).

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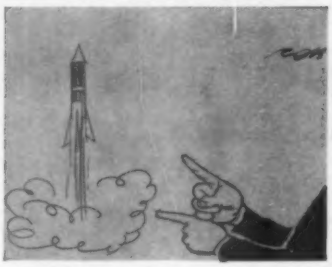
NEWS

PRESS TIME REPORT: Looking ahead in business, Washington wire, Cost index of plant maintenance, and Looking ahead in labor ..... *after* 54
EDITORIAL: Are you crying or buying? 61
EQUIPMENT NEWS: Mechanical fingers + magnet = slick retrieving tool 100
CATALOG NEWS: Switchgear, emergency lighting, 59 more 164
LABOR RELATIONS NEWS: Garnishment spells rising costs 178
MATERIALS NEWS: Glove so sensitive it reads Braille 192

DEPARTMENTS



PROBLEM-SOLVING GUIDE: Direct tap to 1000-and-1 useful ideas 4
LETTERS: Survey stirs interest in ABC inventory control 6
HUMAN RELATIONS: Sign language moves missiles 134
IDEAS OF THE MONTH: Hunting down accident hazards 155
BOOKS: Cost control that really works 200
FILMS: Work delegation, modern steel production, space control 204
ADVERTISERS' LITERATURE: Explore this rich source of information 206

COMING

In September see how management ingenuity teams up with modern equipment and methods to hold the line on operating costs at Minneapolis Honeywell. Barrel plating machine pictured at left completely automates zinc plating. Another idea that's paying off in increased efficiency is an assembly quality control system that pinpoints good, mediocre, and poor workmanship in the production section of the plant.

COVER

Plant Engineers E. J. Drzal, V. Mlcuch, and L. J. Swiston (left to right) discuss additional renovation plans in the highly conveyorized assembly section of Western Electric's newly updated Hawthorne plant.

Painting by Frank Lacano

70TH YEAR OF PUBLICATION
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Turn the page for FACTORY's Problem-Solving Guide

PROBLEM-SOLVING GUIDE

For your action index

1.0–1.4 Plant maintenance and engineering

MANAGEMENT AND PRACTICES (1.1)

1.10 Conference in Japan spurs PM (Aug. '61) p. 98 (1.11)
1.111 Corrosion MPs on guard duty (Aug. '61) p. 152 (1.303)
1.112 Disaster control on limited budget (Aug. '61) p. 144
1.113 Camera peeks underground—in color (Aug. '61) p. 146
1.113 Jet cleaning is accountant's delight (Aug. '61) p. 149
1.114 Clover-leaf bench layout aids testing (Aug. '61) p. 91

BUILDINGS AND YARDS (1.2)

1.203 No-slip answer to oily problem (Aug. '61) p. 145
1.204 Rate your plant housekeeping (Aug. '61) p. 90 (1.201)
1.207 Your plant's chance for fame (Aug. '61) p. 83
1.208 New life for an old workhorse (Aug. '61) p. 72
1.210 Spot the gaps in plant security (Aug. '61) p. 66 (3.105)

SERVICES AND FACILITIES (1.3)

1.308 X-ray dopes out pipe width (Aug. '61) p. 151 (1.117)

ELECTRIC SERVICES (1.4)

1.402 How to succeed with automatic control (Aug. '61) p. 70
1.404 Keeping bugs out of control panels (Aug. '61) p. 151
1.405 Trouble-shooting templates (Aug. '61) p. 152 (1.404)
1.408 Substation solves space shortage (Aug. '61) p. 145

2.0–2.4 Production

ORGANIZATION AND MANAGEMENT (2.1)

2.103 The business of defense contracts (Aug. '61) p. 92

PRODUCTION CONTROLS AND SYSTEMS (2.2)

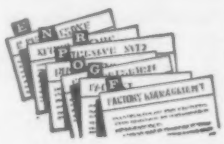
2.201 Taking gobbledygook out of budgets (Aug. '61) p. 146
2.205 Invoice dubs as calling card (Aug. '61) p. 151
2.206 Computer bosses paper machine (Aug. '61) p. 152

MATERIAL HANDLING AND LAYOUT (2.4)

2.303 Pushbutton mill bypasses hands (Aug. '61) p. 146
2.306 Streamlined forging—scale-free (Aug. '61) p. 142
2.307 Automatic annealing (Aug. '61) p. 146 (2.206)
2.311 Four clever efficiency boosters (Aug. '61) p. 147
2.315 Exotic metals do all kinds of jobs (Aug. '61) p. 84
2.316 Bells move to paint electrostatically (Aug. '61) p. 150

MATERIAL HANDLING AND LAYOUT (2.4)

2.402 This hose takes a heck of a beating (Aug. '61) p. 149
2.404 No end to lift truck's use (Aug. '61) p. 190 (2.410)



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2.405 Staples speed shipping (Aug. '61) p. 144 (2.408)
2.405 Keeping an eye for missing links (Aug. '61) p. 145
2.405 Plastic gets a tonic (Aug. '61) p. 148 (2.315)
2.408 Tattletale light chases traffic cops (Aug. '61) p. 143
2.408 Cargo keeps cool (Aug. '61) p. 143 (2.206)
2.408 Jet air shipments sans cartons (Aug. '61) p. 150
2.409 Translucent tanks combat corrosion (Aug. '61) p. 143
2.409 Diagonal supports cut handling time (Aug. '61) p. 150
2.410 Truck built to ward off sparks (Aug. '61) p. 145
2.410 Choo-choo fork truck runs on rails (Aug. '61) p. 148

3.0–3.4 Plant management

ORGANIZATION AND POLICIES (3.1)

3.104 The millstone of indirect costs (Aug. '61) p. 87
3.107 Big oaks from little acorns (Aug. '61) p. 134
3.107 Student pranks go space age (Aug. '61) p. 143

PERSONNEL DEVELOPMENT (3.2)

3.202 Today's prophets of doom are wrong (Aug. '61) p. 62
3.204 VIP—ornery but resolute (Aug. '61) p. 137 (3.207)
3.205 Plants—an annex to schools? (Aug. '61) p. 134 (3.201)
3.206 Escape that paper landslide (Aug. '61) p. 137
3.207 The lonely supervisor (Aug. '61) p. 88 (3.305)
3.208 "Sign" talk moves missiles (Aug. '61) p. 134 (3.201)

EMPLOYEE RELATIONS (3.3)

3.305 Labor's strike loss at a glance (Aug. '61) p. 144
3.305 Got competish? Tell your workers (Aug. '61) p. 149
3.306 Fast, costless way to plant feeding (Aug. '61) p. 143
3.312 An argument for safety (Aug. '61) p. 138
3.314 The independent bargain (Aug. '61) p. 148 (3.202)

LABOR COSTS (3.4)

3.403 Indirect labor pay—nine more cities (Aug. '61) p. 82
3.405 Downtime gremlins on the run (Aug. '61) p. 138

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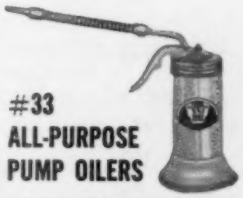

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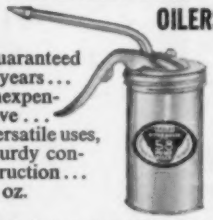

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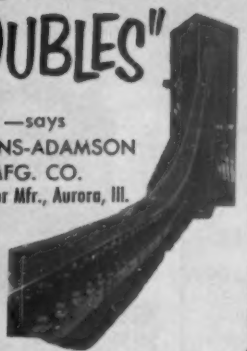

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LETTERS

Survey stirs interest in inventory control

Dear Sir:

I found your "Exclusive Survey of Production and Inventory Control" (FACTORY, April 1961, page 80) of particular interest. Our plant is among the more than 40% not using the ABC method of inventory control. I would appreciate any information you can give me on how this method works.

Ronald A. Keehner
Production Planning Manager
FMC Packaging Machinery Div., Green Bay, Wis.

► **The method is to concentrate on those items of inventory which account for the major part (say 80%) of the over-all volume and/or costs. "A" items (most costly) need most control; "C" items least. An hour spent controlling "A" items yields greater return than same time spent fussing over nickels-and-dimes items.—ED.**

1961 engineering fact file wins kudos

Dear Sir:

Your "Top Plants of 1961 Engineering Fact File" (May, page 129) was extremely interesting. It contains valuable information which will guide us in our future expansion of plant facilities.

I would appreciate your sending me a reprint of this file.

John Gilroy
Director of Plant Engineering
Harnischfeger Corp., Milwaukee, Wis.

► **We're pleased that you find the specifications of our Top Ten Plants useful in planning expansion of Harnischfeger facilities.—ED.**

Wanted: training film sources

Dear Sir:

I've had little success in finding a source of supply for films on training in performance rating. After reading FACTORY and seeing the excellent response to letters, I feel you're my best bet.

K. A. Hopkins
Industrial Engineering
Aluminum Co. of Canada, Ltd., Kingston, Ont.

► **We're sending you names of eight distributors of industrial films from our files. Some of these should be of help.—ED.**

Wage incentives for indirect work

Dear Sir:

One of the many tables of data in "The Truth About Wage Incentives and Work Measurement Today" (FACTORY, April 1959, page 74) showed percentages of plants surveyed that measure indirect operations. Please

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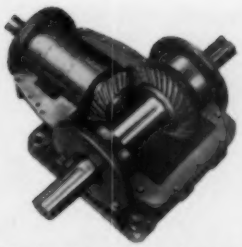
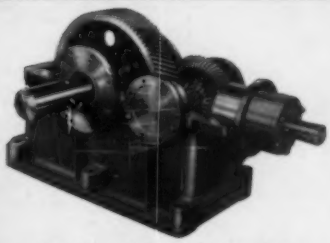
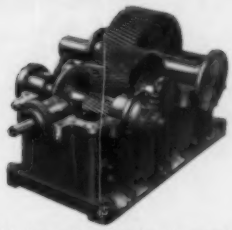
King of Prussia (Suburban Philadelphia), Pennsylvania



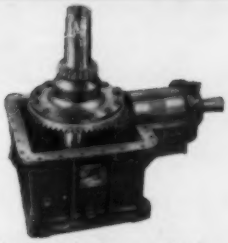
Single reduction horizontal



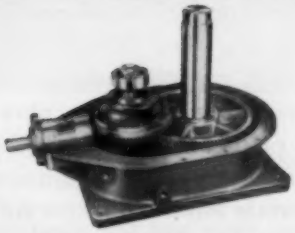
Double reduction horizontal



Triple reduction horizontal



Single reduction vertical

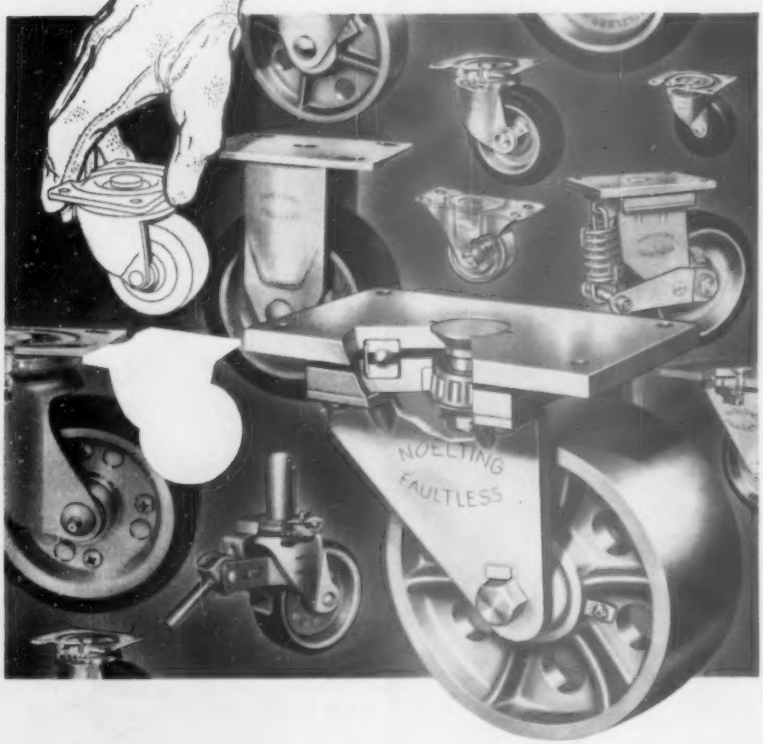


Double reduction vertical

Triple reduction vertical

the ONE Caster Source is

Faultless



Faultless manufactures over 10,000 caster types, sizes, and varieties . . . casters for every conceivable purpose . . . *The Casters* to move your products easily, in quantity, economically! Faultless Casters are engineered and tested to roll smoothly and efficiently under any load from 15 lbs. to 15,000 lbs. per caster. And Faultless manufactures a complete selection of swivel, rigid, plate, and stem casters, plus a wide variety of special application casters. This complete selection from one manufacturer—Faultless Caster Corporation—includes *The Casters* to reduce materials handling costs and increase efficiency at your plant.

Your Faultless Industrial Distributor, or your nearby Faultless Sales Engineer can supply you with detailed information on the complete Faultless Caster line. Also, your Faultless Distributor maintains a substantial stock of Casters for immediate shipment.

NOELTING Faultless Casters

Faultless Caster Corporation

EVANSVILLE 7, INDIANA

Branch Offices in principal cities of the U.S.; see the Yellow Pages of the telephone book under "Casters." Canada: Stratford, Ontario

Begins on page 6

LETTERS

send me the names of metalworking plants that measure indirect work that we might talk with.

E. St. James
Supervisor, Time Standards
Haloid Xerox, Inc.
Rochester, N. Y.

► **Probably most of these plants would be glad to discuss their know-how and experience with reader St. James. But since we promised anonymity to the survey respondents we just can't release the names.—ED.**

Labor costs from Japan

Dear Sir:

I think your readers will be interested in the latest labor cost figures from Japan. These figures bring my interview with FACTORY (February 1961, page 84) up to date.

In less than a year, direct wages have risen about 30%, from 23¢ to 30¢ an hour. Anyone considering a long-range program of purchasing from Japan should keep this in mind. If the percentage increase continues, Japanese wages will soon be at our level.

Fred Schlissel
Management Consultant
Assistance for Industrial Development, Inc.
Elmont, N. Y.

Needle in a haystack

Dear Sir:

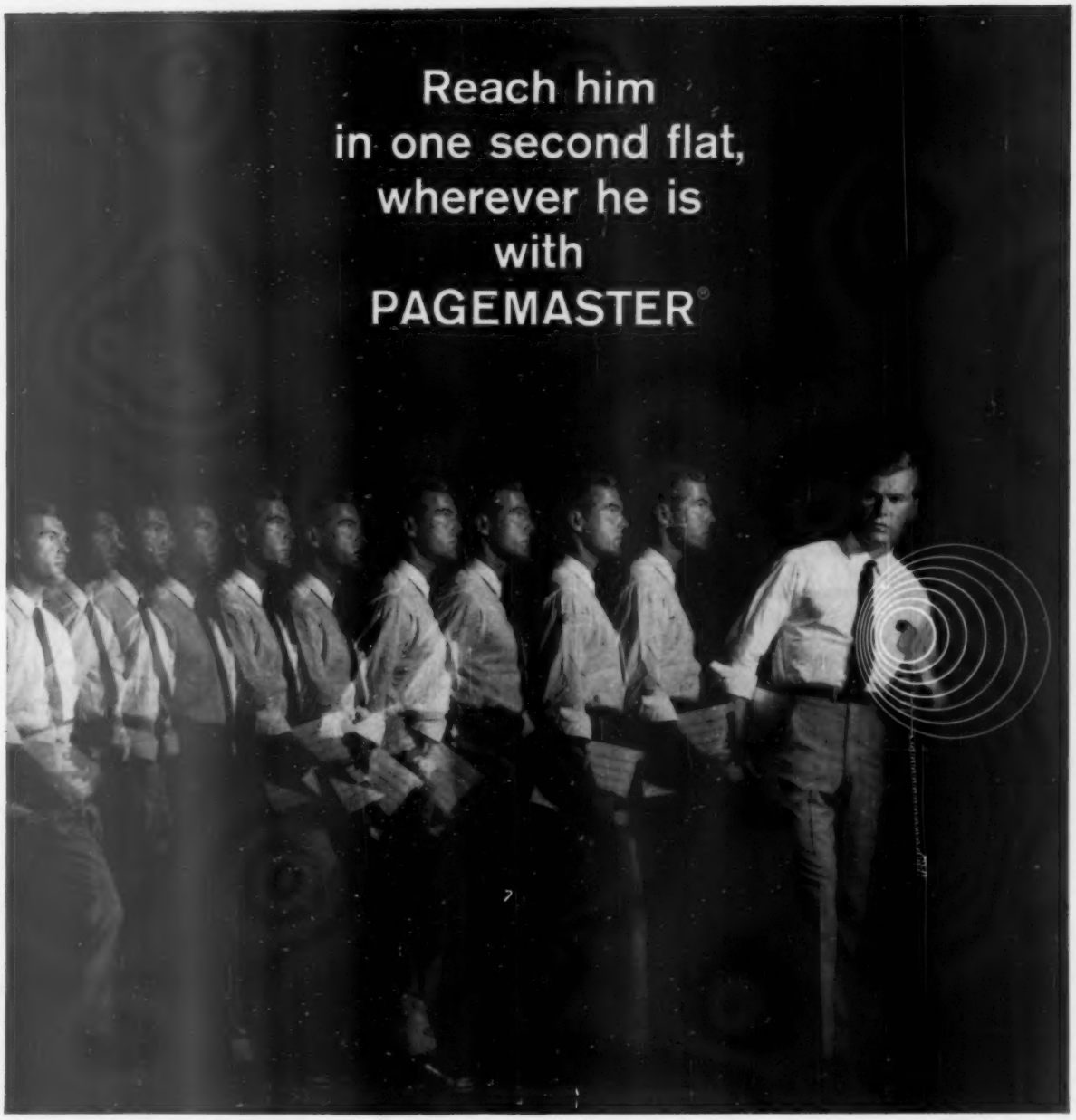
Sometime ago FACTORY had an article concerning the calculation for the cost of carrying inventory.

I would like to obtain

FACTORY welcomes opinions and suggestions from its readers. They help us put management problems in better perspective. Letters should be addressed: The Editor, FACTORY, 330 West 42nd St., New York 36.

For more facts Circle 410 on Reader Service Card

Reach him in one second flat, wherever he is with PAGEMASTER®



Find him instantly—in the stockroom, at the other end of the factory, even out of doors—way beyond the range of conventional paging systems.

Alert him—and only him. His—and only his—pocket-sized PAGEMASTER will beep discreetly. And will sound, again and again until he checks in. For PAGEMASTER is gentle but insistent.

What equipment do you need for a PAGEMASTER Selective Wireless Paging System? Nothing more than a desk-top encoder, a transmitter, an antenna, and transistorized, feather-weight receivers. Installation is immediate and inexpensive—no costly lights, loops or speakers are needed, no expensive drawn-out structural modifications are involved. And you can add receivers—up to several hundred—as your paging applications increase.

Want to see how much faster and how much more economically PAGEMASTER reaches key people . . . to help them get things done? Your STROMBERG-CARLSON® Communications Consultant has the irrefutable facts. For his name, call Western Union Operator 25, or write:

Commercial Products Division – Box F
1408 North Goodman Street
Rochester 1, New York

GENERAL DYNAMICS | ELECTRONICS

In modern business communications...THERE IS NOTHING FINER THAN A STROMBERG-CARLSON®

a tisket, a tasket

a forty-bushel basket

Forty bushels happens to be the capacity of the extra-large bucket on this H-25 "PAYLOADER" tractor-shovel. The bucket is accurately sized to scoop up and carry 2,000-lb. loads of cottonseed meal from storage to bagging machine, but also handles bulk cottonseed and cottonseed hulls.

The Model H-25 is one of the many sizes of "PAYLOADER" units that perform many kinds of material-moving jobs in industry. It can handle 2,500 lbs., travel at speeds up to 11 m.p.h. in either direction, and has power-steer and power-shift to maneuver easily and quickly — negotiates narrow aisles, turns, ramps and doorways with ease. It goes in and out of boxcars readily to unload bulk cargoes fast and economically.

Dependable operation. The H-25 is provided with a torque-proportioning differential that assures more positive traction and less wheel spin when tractive conditions are variable. It has extra built-in protection that assures dependable, low-maintenance performance: a closed, pressure-controlled hydraulic system *plus* special filters and seals throughout the machine to protect mechanical and electrical parts from damage due to dust, moisture and corrosion.

Low-cost bulk handling by the use of H-25's is an established fact in hundreds of applications. Whether you want to handle 40 bushels of meal or 1¼ tons of metal at a time, an H-25 is a proven, economical solution to the problem. Your nearby Hough Distributor is ready to prove it.

HOUGH®

THE FRANK G. HOUGH CO.
755 Sunnyside Ave.
Libertyville, Ill.
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

☐ Send PAYLOADER bulletin "Industrial Material Handling from A to Z."

Name
Title
Company
Street
City State
6-G-2

Begins on page 6

LETTERS

either a copy of this article or the calculation used by the author.

C. J. Trone, Jr.
Assistant to President
Whirlpool Corp.
Benton Harbor, Mich.

► **The article is probably the report of FACTORY's interview with H. Ford Dickie in our June 1958 issue, page 68.—ED.**

Rules mean cleanliness

Dear Sir:

I would very much like to get a copy of the 28 rules for employees referred to in FACTORY's "Maintenance Management Today" (March 1961, page 77).

As processors of motion picture film, we are interested in maintaining a high degree of cleanliness in our plants.

J. R. Darby
Engineering Dept.
Technicolor Corp.
Hollywood, Calif.

FACTORY

August 1961 Vol. 119, No. 8

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SILICONE NEWS from Dow Corning

Now I'm In Little League

Since We've Converted "Down-time" to "Spare-time" by Specifying Silicones

Three years ago, when Little League baseball was organized in our community, I was interested. Because I'm a family man with three boys, and I'd been a fair ball player, I was asked to manage a team. I wanted to help, but with my job, I knew I wouldn't have the time.

You see, I'm maintenance manager at the local foundry and metal working plant. We have more than 1500 integral horsepower motors. When a motor burns out, it has to be replaced immediately. With the increased frequency of failure in the summer... plant temperatures skyrocket... my time is not my own.

One day I saw a Dow Corning advertisement about silicone insulated motors. I wrote them and got all the information... technical data, too. After studying the material, I suggested to management we run our own life tests by having our problem motors rewound with silicones instead of with Class B insulation, as we were doing.

Result: we now specify silicone insulation in all of our motors exposed to heavy duty cycles, shock loads, frequent start-stop-reverse operation, high ambient temperatures and humidity. Savings are around $5000 a year . . . *not counting the savings in production and maintenance time.*

The sharp reduction in motor maintenance has given me some free time. This summer I managed a Little League team. By the way, my oldest boy looks great at second base, and he's no slouch at the plate.

Say, why don't you write Dow Corning for their literature on silicone insulated motors and transformers? I'm glad I did.

(This fictional story is based on actual plant experience with silicone insulation. Name provided on request.)

For information on silicone insulated motors, write Dept. 4420

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

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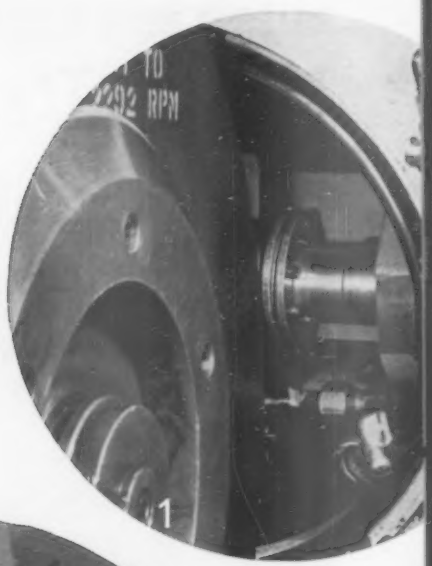
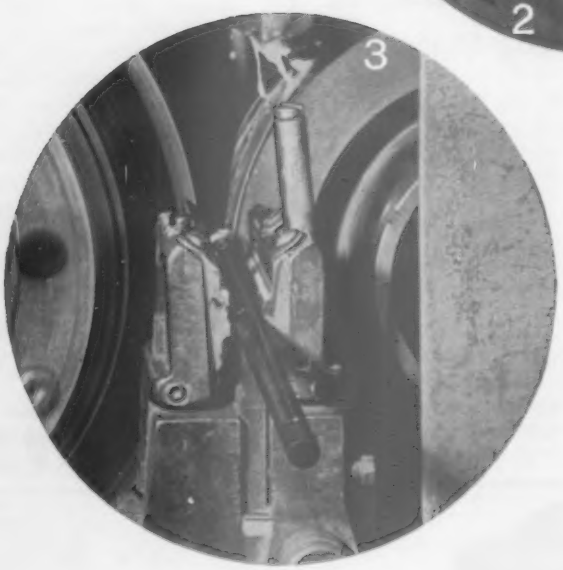




Industrial Distributors (Sales), Ltd.

FACTORY

Each of these jobs is done better and cheaper with natural diamonds

Here are four cutting and grinding operations being performed with industrial diamonds.

Three of them were once done with other kinds of tools. One couldn't be done at all, were it not for the unique *combination* of properties that only diamonds possess—excellent cutting ability coupled with fantastic endurance.

Result: your people spend less time changing tools, more time actually producing.

If you cut, sharpen or smooth in your business, you can probably use diamonds to advantage. Test them against the method you're using. You'll find out how efficient – and economical – a diamond can be, especially now.

Best grit for metal-bond wheels developed by the Diamond Research Laboratory in Johannesburg

A new impact crushing method for natural diamonds is producing the strongest and most durable diamond grit ever obtained for metal-bond wheels. Your tool and wheel manufacturer is ready to help you select the diamond tool that's right for *your* job.

1 **Dressing Grinding Wheels** *that groove propeller shafts for Evinrude Motors, Milwaukee. Cutters are powdered metal matrix impregnated with small, blocky natural diamonds. They show no wear after months of use.*

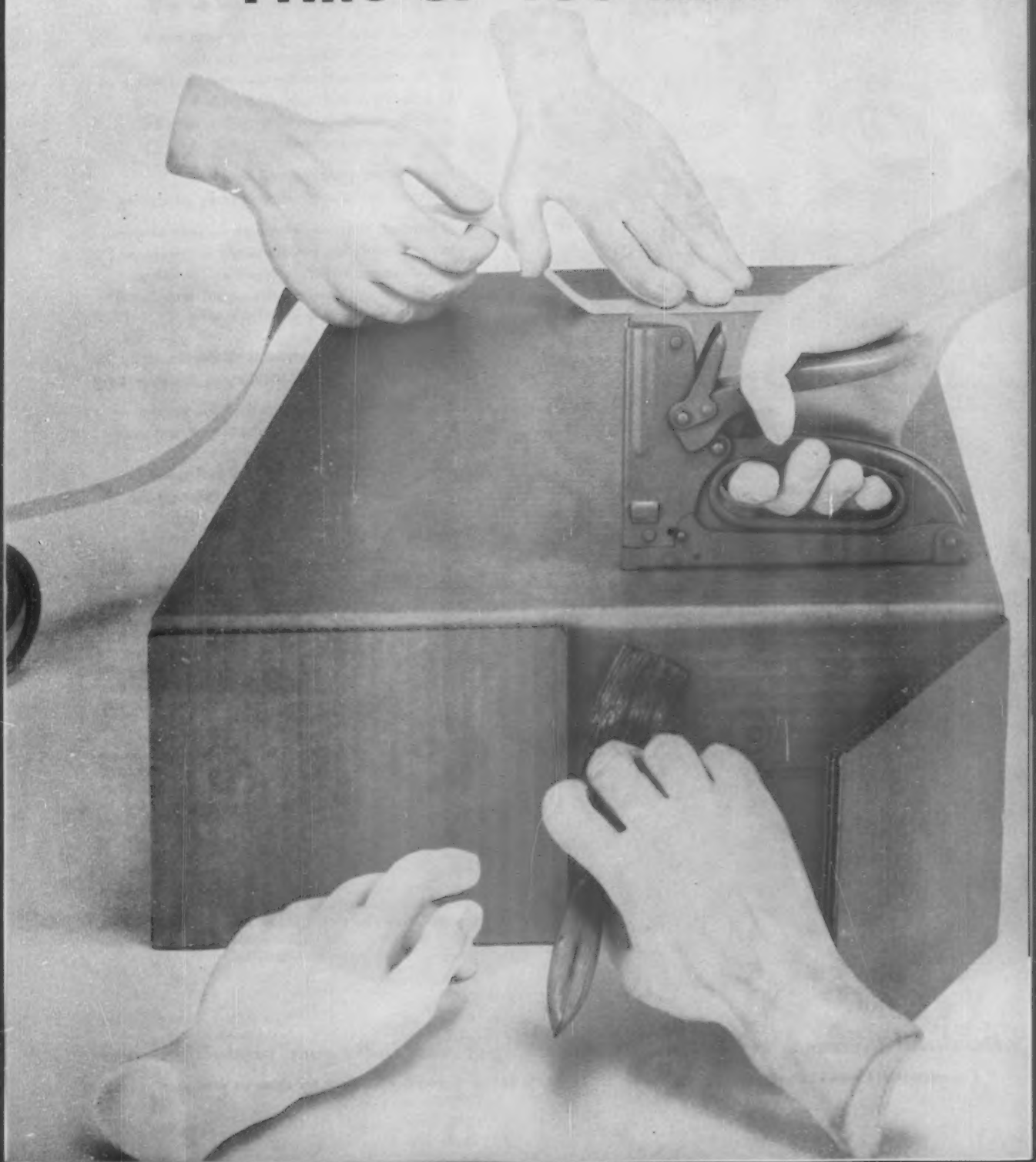
2 **Boring and Facing Aluminum** *pinion carriers for Chrysler Corporation, Detroit. Dimensions are held within ±.001 inch, producing finishes to 20 microinches. Conventional tools could not withstand aluminum's abrasiveness, nor meet these tolerances.*

3 **Grinding Synthetic Sapphire** *and quartz rods with diamond grinding wheel. Tolerances for diameters: ±.0002 inch; concentricity: ±.0002 inch. After trying every other grinding method, this diamond-coated unit was installed by Duncan-Inglewood, Inc., Inglewood, Calif. Rods are now being turned out on a production basis.*

4 **Band-Sawing Optical Glass.** *New diamond-coated band-saw blade cuts optical glass to pattern shapes at Dia-Chrome, Inc., Glendale, Calif. Diamond band saw can also cut reinforced plastics, ceramics, marble. Thin materials can be cut without coolant; dense materials require water or water-oil emulsion.*

Industrial diamonds cut practically everything . . . especially your production costs

TYING UP TOO MANY HANDS



IN PACKAGING?

Acme Steel mechanized strapping beats any other method hands down!

Too many hands too often strangle the efficiency of a packaging operation. New Acme Steel innovations in mechanized strapping convert wasted motion into concentrated productivity—at the press of a button. By uniformly tensioning, sealing and cutting your steel strapping automatically, Acme Steel Strapping Machines put your operation on a high volume, production line basis. You multiply packaging output without adding a man. In fact, Acme Steel mechanized methods usually *free* busy hands for other assignments.

The secret behind the industry-wide success of Acme Steel mechanized equipment is not only its speed, but remarkable flexibility. Basic machines can be easily adapted to meet virtually any strapping requirement. The result is double savings: 1) You save considerable time and manpower; 2) You save on cost of the equipment itself.

Have your local Acme Idea Man explain exactly how mechanized strapping can most profitably serve you—and pay for itself within months. Or, write for complete details.

ACME STEEL

IDEA LEADER IN

STRAPPING - STITCHING - FRAMING

Acme Steel Company, Dept. FACP-81, 135th St. & Perry Ave., Chicago 27, Ill.

Whatever your special fire hazard, Grinnell has the right system for you

The basic fire extinguishing agents are shown on the chart below with the most common applications cross-referenced by check marks. If your process requires a specially designed system — the research and test facilities of the Grinnell Company stand ready to serve you.

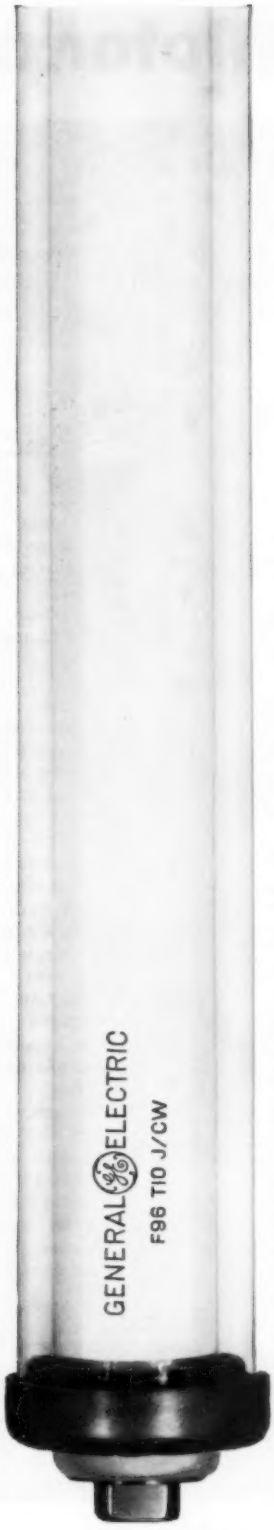
Extinguishing blanket of foam completely covers the floor of this aircraft hangar. 5,897 foam-water sprinklers protect property worth a billion Air Force Defense dollars.

Water spray, applied to outside storage of paints and solvents, cools to inhibit internal pressure build-up and dilutes to prevent flammable vapor-air mixtures from developing.

SPECIAL FIRE HAZARD	WATER SPRAY	FOAM	CARBON DIOXIDE	DRY CHEMICAL
AIRCRAFT HANGARS	✓	✓		
ALCOHOL STORAGE	✓	✓	✓	
AMMUNITION LOADING	✓			
AMMUNITION MAGAZINES	✓			
ASPHALT IMPREGNATING	✓			
BATTERY ROOMS			✓	
CARBURETOR OVERHAUL SHOPS	✓	✓	✓	✓
CLEANING PLANT EQUIPMENT	✓	✓	✓	✓
DOWTHERM	✓			
DRYING OVENS	✓		✓	✓
ENGINE TEST CELLS	✓	✓	✓	
ESCALATORS, STAIR WELLS	✓			
EXPLOSIVES: MANUFACTURING, STORAGE	✓			
FLAMMABLE LIQUIDS STORAGE	✓	✓	✓	
FLAMMABLE SOLIDS STORAGE	✓			
FUEL OIL STORAGE	✓	✓		
HANGAR DECKS	✓	✓		
HYDRAULIC OIL, LUBRICATING OIL	✓		✓	
HYDRO-TURBINE GENERATORS	✓		✓	
JET ENGINE TEST CELLS	✓	✓	✓	
LIGNITE STORAGE AND HANDLING	✓			
LIQUEFIED PETROLEUM GAS STORAGE	✓			
OIL QUENCHING BATH	✓	✓	✓	✓
PAINTS: MANUFACTURING, STORAGE	✓	✓	✓	✓
PAINT SPRAY BOOTHS	✓		✓	✓
PETROCHEMICAL STORAGE	✓	✓	✓	
PETROLEUM TESTING LABORATORIES	✓	✓	✓	
PRINTING PRESSES			✓	
REACTOR AND FRACTIONATING TOWERS	✓			
RECORD VAULTS			✓	
RUBBER MIXING AND HEAT TREATING	✓			
SHIPBOARD STORAGE	✓		✓	
SOLVENT CLEANING TANKS		✓	✓	✓
SOLVENT THINNED COATINGS		✓	✓	✓
SWITCHGEAR ROOMS			✓	
TRANSFORMERS, CIRCUIT BREAKERS (outdoors)	✓			
TRANSFORMERS, CIRCUIT BREAKERS (indoors)	✓		✓	
TURBINE LUBRICATING OIL	✓	✓	✓	✓
VEGETABLE OIL, SOLVENT EXTRACTION	✓	✓		

There's a Grinnell Fire Protection System to protect your property. You benefit from over 90 years of fire protection experience when you rely on Grinnell. Send for this free 44-page booklet today. Write Grinnell Company, Providence 1, R. I.

SOME LIKE IT HOT



Eight-foot G-E T10 Lamps are rated at 13,000 lumens peak output; T10J's at 12,900 lumens. Both are also available in four and six-foot lengths.

SOME LIKE IT COLD

THESE NEW GENERAL ELECTRIC ALL-WEATHER FLUORESCENT LAMPS LIKE IT WHETHER THE WEATHER'S HOT OR COLD

Now you can end "cold weather fade out" that hits regular fluorescent lamps. New G-E "All-Weather" Fluorescents are specially designed to perform well over a wide temperature range through winter and summer weather.

The General Electric jacketed lamp shown at left neither *looks* nor *acts* like an ordinary fluorescent. Its special glass "storm window" shields it against wintry blasts. Below 40° it's the most powerful fluorescent you can buy. In fact, the colder it gets, the brighter the lamp gets —right down to 20° below zero!

So, if your fluorescent lighting system must perform well under widely varying temperature conditions, or where low temperatures are a problem, you need All-Weather lamps. The Jacketed lamp (T10J) is designed for exposed locations. Its companion, the unjacketed lamp (T10), is made for use when the lamp is protected. Write for full details on G-E "All-Weather" Fluorescents today. General Electric Co., Large Lamp Dept. C-114, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts Circle 417 on Reader Service Card

Wisconsin Motor combats rising

At Wisconsin Motor, 250 new engines are tested in this run-in room simultaneously. A special Mobil run-in oil used during testing leaves a protective coating that guards against rust during shipment and storage and provides initial lubrication when engines are started up in the field. The special non-gumming Mobil gasoline used in testing leaves no residue . . . eliminates the need for draining carburetor and gas bowl.

Mobil

FACTORY

costs with help of Mobil Program!

World's largest manufacturer of heavy-duty, air-cooled gasoline engines reduces maintenance expense by $25,952 per year!

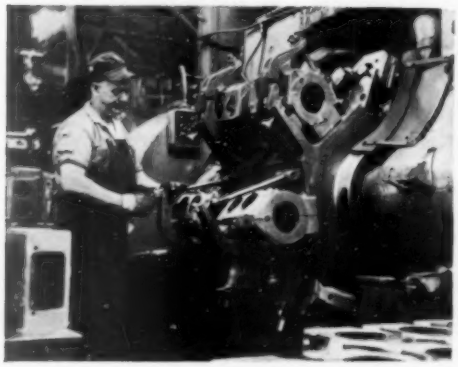
Wisconsin Motor Corporation, Milwaukee, Wisconsin, is the world's largest manufacturer of heavy-duty, air-cooled gasoline engines. To help combat today's rising operating costs while maintaining its reputation for high quality products, Wisconsin Motor looks to a continuing Mobil Program of Correct Lubrication.

Through installation of preventive maintenance and lubrication schedules plus recommendations for improved handling and application of lubricants, the Mobil Program brought about a reduction in maintenance cost of $25,952 in 1960.

Your plant, too, could benefit from such a continuous cost-reducing program. For full information about the Mobil Program, contact your Mobil Representative, or write, Mobil Oil Company, 150 East 42nd Street, New York 17, N. Y.

Mobil charted all machinery in the Wisconsin Motor Plant and set up a program of scheduled lubrication and preventive maintenance. As a result, two maintenance men were freed to handle other duties with savings of $7,663 annually. A Mobil suggestion on handling and disposal of waste oil and solvents meant additional savings of $1,146.

Mobil Engineers analyzed storage and distribution practices for cutting oil used in screw machines . . . recommended that oil be purchased in bulk and piped directly to machines. Considerable savings were realized through quantity delivery discounts and reduced oil handling costs. Savings in 1960 totaled $7,855.



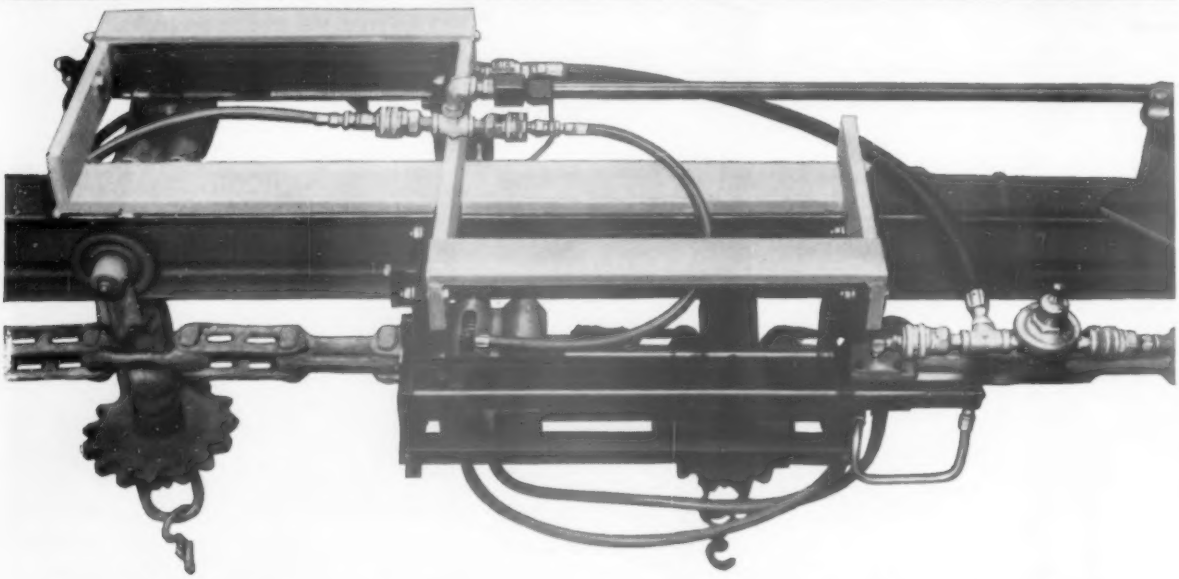
Careful adherence to specially developed Mobil lubrication and PM procedures reduced maintenance on rotary mills used in machining and finishing crankcase castings where an oil reservoir contamination problem was encountered. Savings: $2,507 yearly.

Mobil recommended proper way oils and spindle lubricants . . . established correct application schedules, reducing scoring problems and maintenance costs on grinders and broaches. Annual savings to Wisconsin Motor: $6,781.

Correct Lubrication

For more facts Circle 418 on Reader Service Card

NEW ARO PORTABLE TROLLEY CONVEYOR LUBRICATOR



Easily Moved From One Conveyor to Another-*Weighs only 26 lbs.*

- One man can install while conveyor is running
- Automatic—lubricates while conveyor is in motion
- Fold-A-Way mechanism prevents damage to lubricator or conveyor in case of bent wheels
- Dependable—never misses a fitting
- Lubricates from 100 ft. to 100 miles of conveyor on one filling of lube
- Pays for itself in labor and maintenance saved

Correct lubrication of trolley conveyors saves you lots of headaches. You avoid costly shutdowns and delays. You slash repair and maintenance costs. And you add extra years to conveyor life.

The new Aro Portable Trolley Conveyor Lubricator *assures* correct lubrication automatically . . . even when standard conveyor wheels are intermixed. There's no dripping to cause slipping and injuries either, because this unit will not discharge grease unless coupler is properly connected to fitting. Air powered for dependability, with floor-level control to save labor.

ASK YOUR ARO DISTRIBUTOR TO ARRANGE FOR A DEMONSTRATION. OR, WRITE ARO TODAY.

The ARO EQUIPMENT CORPORATION

Industrial Division, Bryan, Ohio • Aro Equipment of California, 3141 S. Grand Ave., Los Angeles 7. Aro of Canada, Ltd., Rexdale (Toronto), Ontario. Offices in all Principal Cities.

ARO®

TROLLEY CONVEYOR LUBRICATORS
ARO-PAK AIR-CHARGED LUBRICATORS
AIR TOOLS AUTOMATION TOOLS AIR HOISTS

For more facts Circle 419 on Reader Service Card

When it gets too hot for ordinary coatings . . .

SPECIFY PITT CHEM X-201

If you're faced with a corrosion problem that's compounded with a high-temperature condition . . . solve it *permanently* and *fast* with Pitt Chem X-201.

This high-temperature mastic, a combination of selected asphaltic bases and inert mineral fillers is specially formulated to withstand temperatures up to 400°F continuous service. Although X-201 remains permanently plastic, it does not sag or drip.

Pitt Chem X-201 is *solvent-free*. It provides maximum assurance against fire hazard and eliminates shrinkage. Surfaces coated with X-201 are ready for service *immediately* upon completion of application.

Pitt Chem X-201 High-Temperature Mastic has been used extensively to protect chimneys subjected to most severe corrosive conditions. It is also used between insulation such as Foamglas, on hot uninsulated pipe flanges and in areas where similar "hot" corrosive conditions are encountered. Contact your local Pitt Chem Industrial Distributor, he's listed in the Yellow Pages. Let him give you complete information on Pitt Chem X-201 and the Pitt Chem Industrial Coatings Systems.

3308

*PITT CHEM "Insul-Mastic"® Gilsonite-Asphalt Coatings
*PITT CHEM "Tarset"® Coal Tar-Epoxy Resin Coatings
*PITT CHEM "Tarmastic"® Coal Tar Coatings

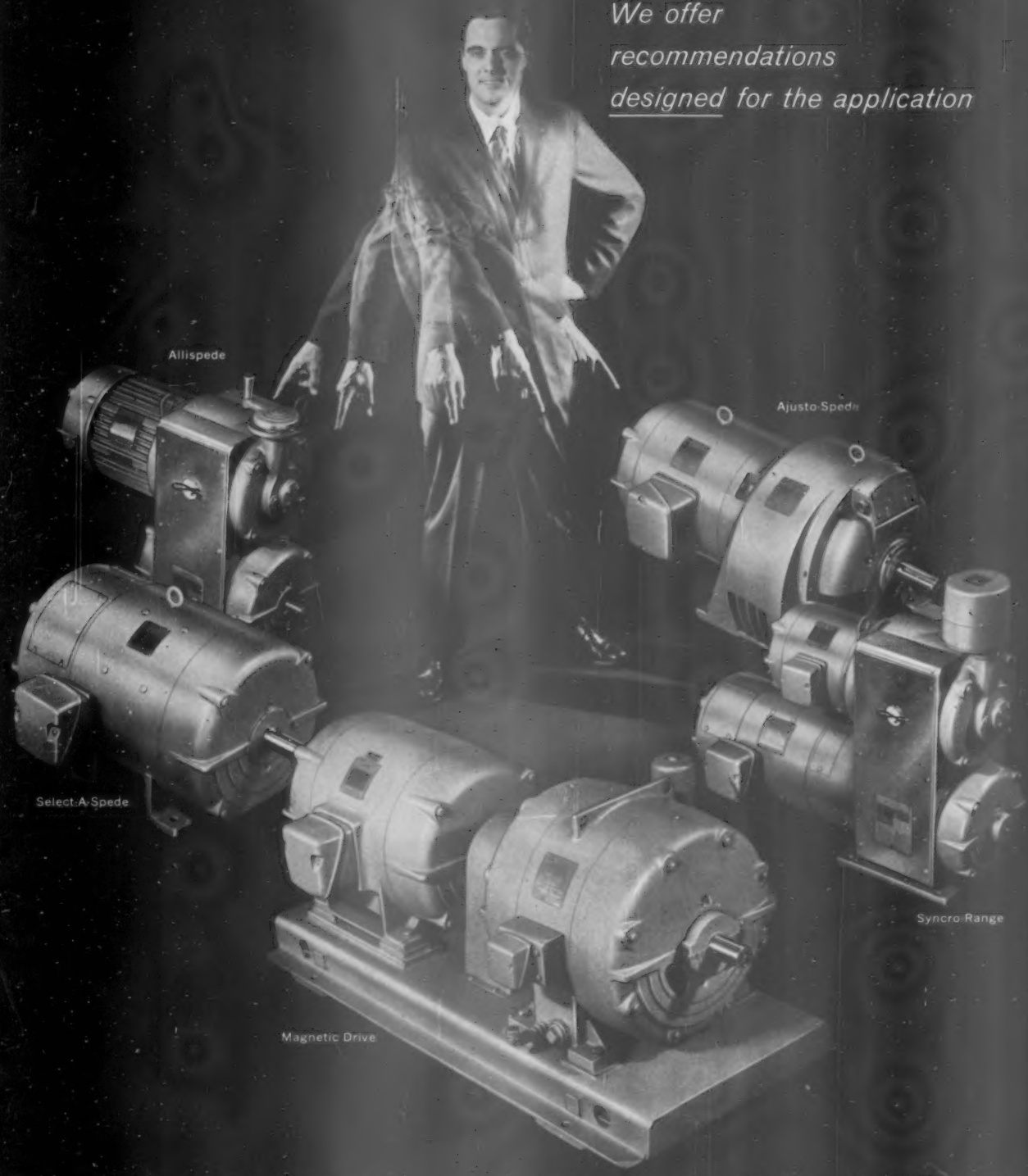
PROTECTIVE COATINGS DIVISION

PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

We offer recommendations designed for the application



ALLISPEDE® DRIVE
A low-cost, accurate mechanical drive. Easily adjusts manually or by optional electric remote control. Simple maintenance. Speeds up to 10,000 RPM, speed ranges from 10:1, ½ to 30 HP. Configuration can be readily changed in the field to meet new requirements. Ask for Bulletin 3601.

SELECT-A-SPEDE® DRIVE
Converts incoming AC power to DC output at the motor to provide a highly responsive, precision drive. Drive motors are available in all types of enclosures. Transistorized control panels permit easy field modifications at any time to suit changing conditions. Available in ratings up to 400 HP. Ask for Bulletins 101 and 2001.

MAGNETIC DRIVE
For applications from 50 to 2500 hp. Liquid cooled magnetic clutch provides precision controlled adjustable speed. Wide speed range with minimum of drift. Available in one, two, three, or four-field construction . . . with or without magnetic brake. Ask for Bulletin 3650.

SYNCRO-RANGE DRIVE
A sophisticated "package system," Syncro-Range Drive from 2 to 200 hp combines an adjustable frequency power supply with compact squirrel cage induction or Syncro-Spede® synchronous motors. Controller offers one-point control of multi-motor process lines. Ask for Bulletins 110, 111, 112.

AJUSTO-SPEDE® DRIVE
Eddy current clutch and a-c motor combination provides stepless, accurate speed control. No brushes, slip rings, or commutators. Simple one-dial control. Sizes ¼ to 100 HP. Offered with wide variety of features including transistor control. Ask for Bulletins 2750 and 2800.

®TM of Eaton Mfg. Co.

NEW design news from Louis Allis

Louis Allis "systems engineering" can provide control for a single process line . . .

or entire plant coordination!

An outstanding line of LOUIS ALLIS adjustable-speed drives from ½ to 2500 hp.

Louis Allis offers you a complete line of adjustable-speed drives with various characteristics for every application where adjustable speed is required.

Experienced Louis Allis field engineers will help you select the best drive for your application. They are supported by regional and factory industry specialists who can recommend a drive system to meet *your* requirements.

The Louis Allis line of drives provides outstanding control features ranging from simple manual to precise electronic or transistorized control. Selection of control varies, of course, with the nature of the installation and the precision required. Where desirable, speed regulation as close as .1% is obtainable.

Controls can be provided which automatically respond to temperature, pressure, or flow. Other control features include threading, inching, jogging, logarithmic acceleration, torque-limit acceleration, tachometer feedback . . . and many other control provisions that can exactly tailor a Louis Allis drive to *your* operation.

For process plants or applications involving inter-related motors and multiple drives, Louis Allis engineers can provide complete "systems engineering" furnishing all electrical rotating components and control.

For expert assistance call your local Louis Allis District Office listed in the Yellow Pages under "Electric Motors" . . . or write direct to The Louis Allis Company, 432 E. Stewart St., Milwaukee 1, Wisconsin. Ask for Bulletin 2900.

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

LOUIS ALLIS

439-220 For more facts Circle 421 on Reader Service Card

BIG SAVINGS with STACKER CRANES

Save Space... Save Time... Save Handling Costs

You make savings in various ways with a Cleveland Tramrail Stacker Crane. You increase the storage capacity of a room because you make greater use of its cubic measurement, i.e., materials are stored to greater heights and aisleway widths reduced.

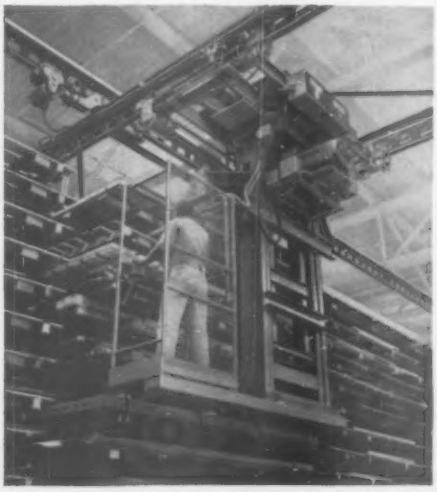
You save time because heavy, awkward loads are picked up, moved and set in place in one fast operation. No time is lost fastening chains, ropes or slings in place, or clamping a grab into position.

You speed handling because a Cleveland Tramrail Stacker Crane will deliver materials from a truck, gondola railroad car or any location on the floor to storage or other areas, directly, with no in-between handling.

You save man-hours because the stacker permits one man alone, operating controls in the cab, to take care of the entire materials handling job without need of floor assistants.

Various designs of Cleveland Tramrail stackers are available to suit practically any situation.

One of several types of Cleveland Tramrail stackers. This unit has a lift of 15'-6", turns 360° clockwise or counterclockwise and handles loads to 3 tons. The mast telescopes and when fork is in high position, the clearance underneath to floor is nearly 8 feet.



Materials are easily lifted on and off racks. All controls are in the stacker cab which also travels up and down to always provide the operator with a close-up view of the load. This equipment permits fast, easy materials selection. Operator can maintain inventory record in stacker cab.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION · THE CLEVELAND CRANE & ENGINEERING CO. · 3259 E. 290 ST. · WICKLIFFE, OHIO

For more facts Circle 422 on Reader Service Card

FACTORY

Ralph Stevenson, Toledo Scale Chemical Engineer, says:

"Bitumastic Coating cuts our users' costs, saves our production money, too."

"Scale levers, bearing blocks and links are potential corrosion targets for thousands of our Toledo Scale customers," notes Mr. Ralph Stevenson, chemical engineer for Toledo Scale Company, Division of Toledo Scale Corporation. "These steel components of our scales are exposed to continuous corrosive attack by weather, temperature changes and salt—in industrial, highway and other outdoor pit-type service installations.

"We've been using Bitumastic® Black Solution for over 10 years now," Mr. Stevenson continues, "and we've found that its moisture-resistant coal-tar base eliminates these corrosion problems for our customers. This Koppers coating also allows us to save production space by storing coated finished parts outside. Its fast drying qualities and ease of application make it extremely economical to use, too."

Bitumastic Black Solution is sprayed on scale levers and other components as they move off the production line to storage at the company's Toledo, Ohio plant.

There are eleven different, specialized Bitumastic coatings available for every industrial or marine corrosion prevention application. These heavy duty Koppers protective coatings may help solve your corrosion problem. For more information, send the coupon or write: Koppers Company, Inc., Tar Products Division, Pittsburgh 19, Pa. District Offices: Chicago, Los Angeles, Pittsburgh, New York and Woodward, Ala. In Canada: Koppers Products, Ltd., Toronto, Ontario.

KOPPERS

BITUMASTIC

COATINGS AND ENAMELS

another fine product of COAL TAR

KOPPERS COMPANY, INC., Tar Products Division
Dept. 135H, Pittsburgh 19, Pa.

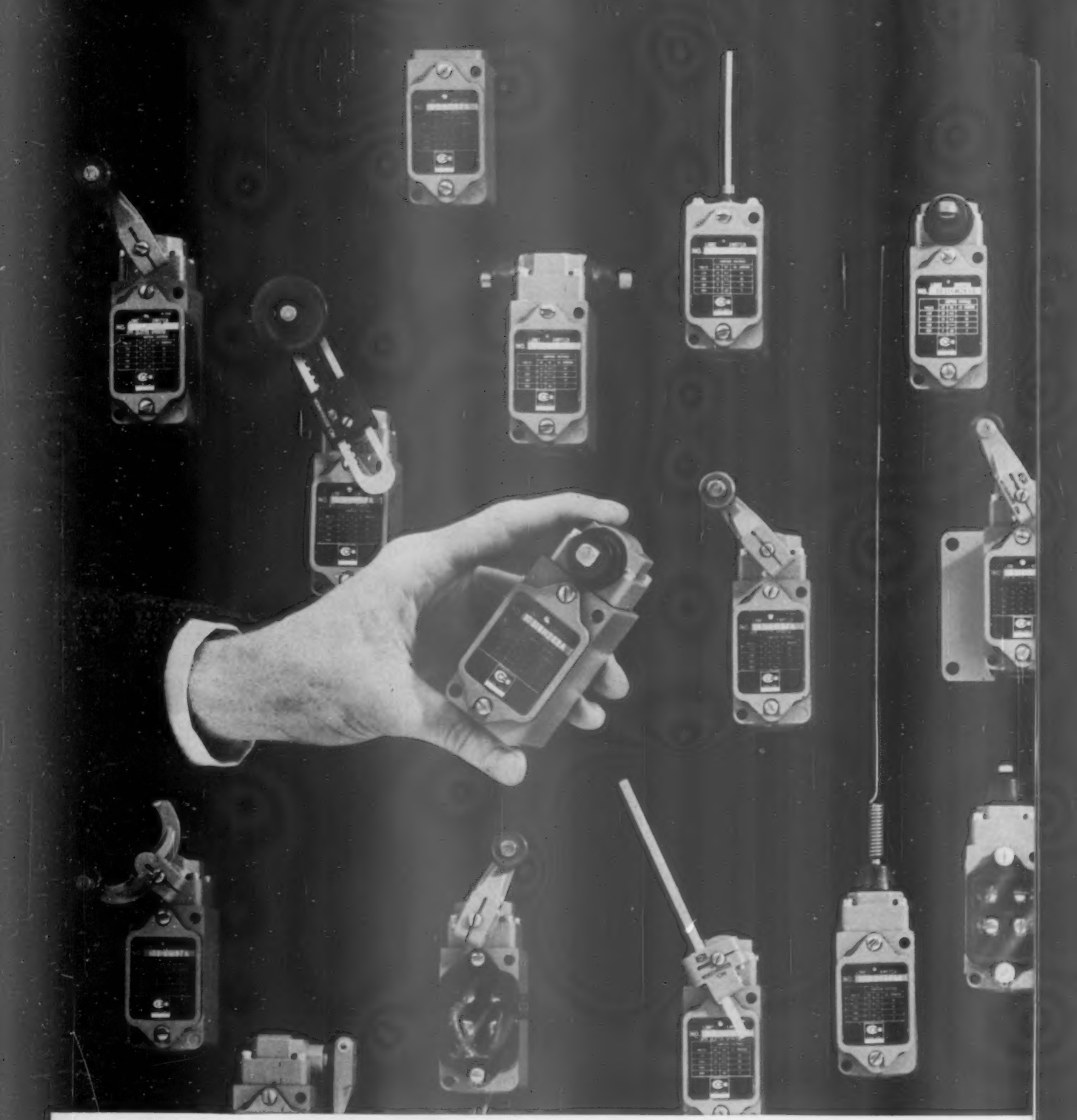
Gentlemen:
Please send me more information on the Bitumastic family of protective coatings.

Name_____

Firm_____ Title_____

Address_____

City_____ Zone____ State_____

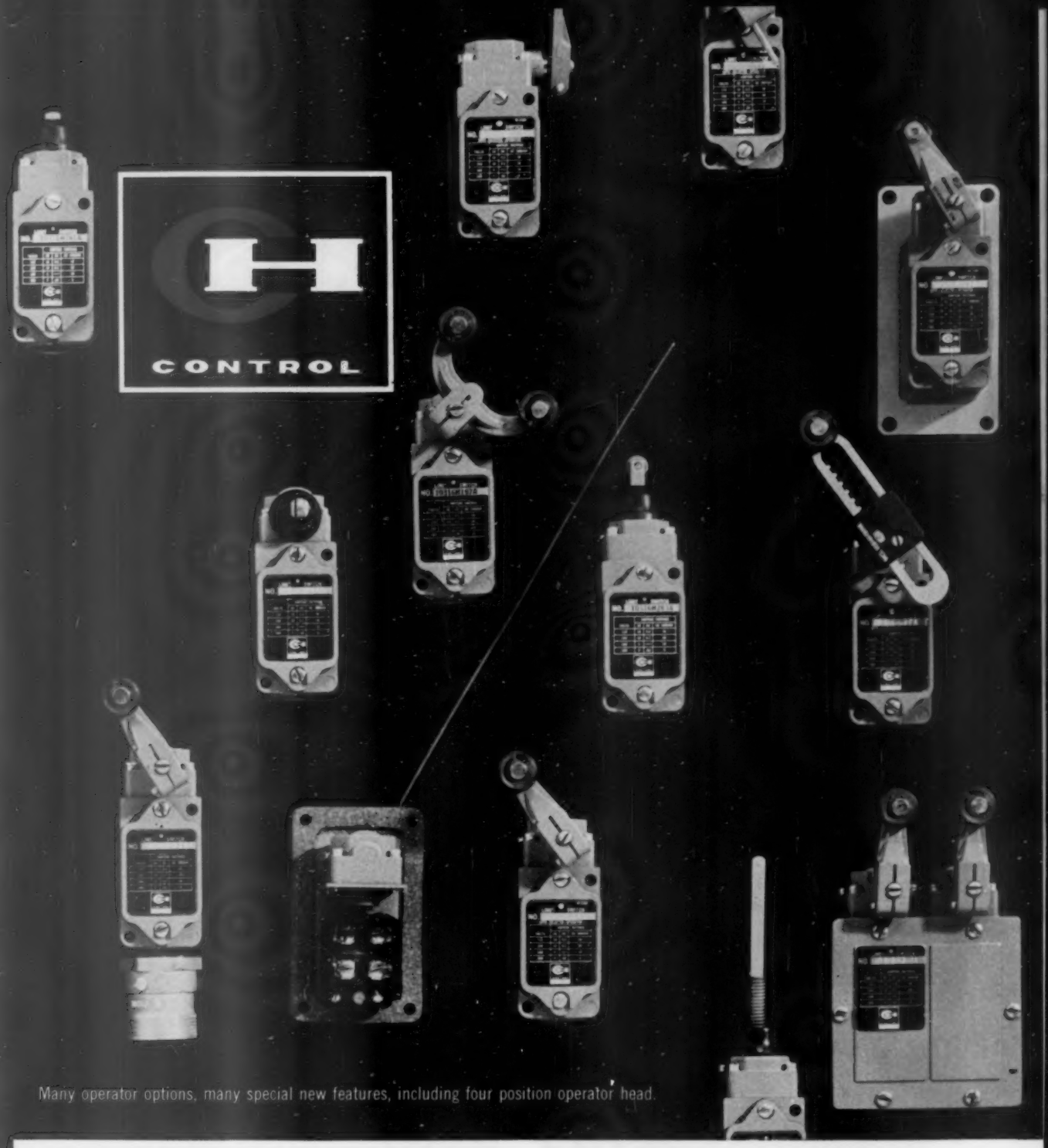


What's your problem? If you can solve it with a

New Cutler-Hammer operator options provide top flexibility... world's best oiltight limit switch

For any use, anywhere, in any position . . . you just can't buy a more reliable, longer-life switch. No other switch is sealed more effectively . . . effectiveness we've proved under test conditions so rugged they will never be equaled in actual service. Even the silver-to-silver contacts are visible for quick inspection. For full details on this complete new line, write for Pub. ED-145-Q211.

For any electrical control problem, contact your local Cutler-Hammer sales office or distributor. They'll supply you with the finest electrical components, the finest service and technical help.



Many operator options, many special new features, including four position operator head.

limit switch, your best answer's here!

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler Hammer International, C. A. • Associates: Cutler-Hammer Canada, Ltd.; Cutler-Hammer Mexicana, S. A.

CONTROL

For more facts Circle 424 on Reader Service Card

NOPCO protects vital production

Hundreds of relays like these, which open and close hundreds of times a day to control cars, doors, signals, are inspected for worn contacts, faulty action.

NOPCO CHEMICAL COMPANY
Harrison, New Jersey
Chemicals • Plastics • Vitamin Products

Is elevator maintenance complex? Yes! As the illustrations indicate. It is an organization task requiring an unusual combination of skills. Plus a wide knowledge of parts, assemblies, functions, replacement procedures, testing and adjusting. Plus the availability of original replacement parts. Plus immediate service in emergencies.

Is OTIS elevator maintenance dependable? NOPCO has been using it since December 15, 1930 to keep seven Otis Freight Elevators and one Passenger Elevator providing vital production capacity.

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.
OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

capacity with Otis Elevator Maintenance

Checking the floor selector that controls an elevator's operation and making any adjustments or replacements needed for top performance.

In the hoistway, on top of the car, the maintenance expert inspects the operating mechanisms and other parts vital to performance and safety.

Under the elevator, checking the action as well as condition of safeties and, as shown here, roller guides that make for smooth riding.

Moving parts requiring lubrication are oiled or greased at regular intervals with lubricants especially selected for prevailing service conditions.

Under the car platform, maintenance man inspects load-weighing switches. These switches weigh the passenger load in the car.

Lubricating an overspeed governor. All elevator safety equipment, though never used, must always be in condition to act without fail.

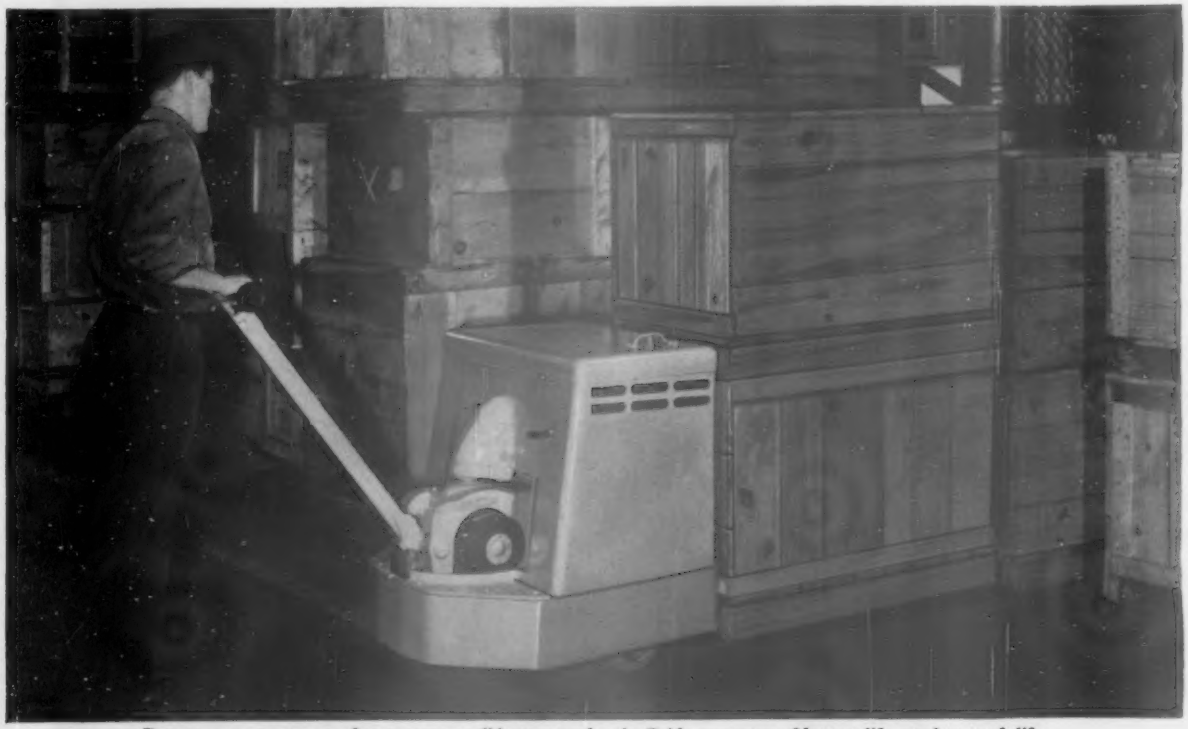
ENGINEERED Otis MAINTENANCE

freight elevators

For more facts Circle 425 on Reader Service Card

EXIDE POWER PACKAGE

Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa.



Extra economy assurance for your new walkie-type truck—the Exide guarantee of battery life equal to truck life.

BATTERY GUARANTEED FOR LIFE OF TRUCK

Let's say you're about to buy a new walkie-type electric industrial truck. You want long battery life for maximum economy, and you don't want the nuisance of ever replacing the battery, if you can avoid it. Well, this is the Exide offer:

For walkie-type low lift trucks and hand tractors, the recommended Exide nickel-iron-alkaline battery (the type invented by Thomas A. Edison) is guaranteed for the life of the truck—provided the truck remains in your possession and approved maintenance procedures are followed.

The Exide Power Package. Recommended battery and charger from the world's broadest lines—plus factory-quality service to cover both.

This is not a reckless offer. Exide knows from countless actual performance records that these batteries readily give this kind of life. Many Exide nickel-iron-alkaline batteries have been used in walkie-truck service for upwards of 20 years and are still going strong. So the plain fact is that we are simply giving you positive assurance of battery value that is already there anyway.

Long life is one of the characteristics of Exide nickel-iron-alkaline batteries. They have other unique advantages too. They are lighter in weight than other batteries. They give off no corrosive fumes during use or while charging. And they can be stored indefinitely without injury. This is of special value during seasonal shutdowns or other inactive periods. All you do is discharge the battery, short-circuit the terminals and store in a clean, dry place.

Of course, for any type electric industrial truck—walkie, rider, or narrow-aisle—the maximum power economy depends on three factors: the right battery for the job, a charger to match, and needed service. This combination is the Exide Power Package.

Your Exide representative studies your requirements, then recommends the battery best for your needs from the broad Exide line. He is completely objective in determining your needs because Exide offers all types: Exide-Ironclad with tubular positive plates, Exide-Powerclad premium flat-plate, and Exide nickel-iron-alkaline. Exide chargers are available in both motor-generator and silicon rectifier types and in sizes to cover all needs. Exide service men are coast to coast, all factory trained on batteries and chargers.

The Exide Power Package is your easiest way to get not only maximum battery life in your applications, but maximum battery economy year after year. Write for details. Exide Industrial Marketing Division, The Electric Storage Battery Company, Philadelphia 20, Pa.

Exide®

FACTORY

For more facts Circle 426 on Reader Service Card

SINGLE WORM

HELICAL-WORM

LINK-BELT fan-cooled worm gear speed reducers...

the compact way to achieve high-hp, high-ratio reduction

DOUBLE-WORM

3 BASIC DESIGNS . . . WITH MANY VARIATIONS! Link-Belt worm gear speed reducers are the space-saving, economical answer for every right-angle speed reduction job. You have your choice of industry's *most complete* range of types, ratios, and sizes . . . in single and double reductions . . . with many combinations of input and output shaft arrangements.

Fan-cooling is the key to the exceptional compactness of this high horsepower, high ratio line. An aluminum radial fan directs a steady flow of cooling air over the finned sides of the housing. This assures maximum heat dissipation . . . permits high horsepower, high ratio reductions in minimum space . . . pays off in lower initial cost for each center distance.

Other features include: rugged, carefully machined housings; automatic splash lubrication; durable centrifugally cast bronze-alloy gears; hardened, ground and polished nickel-steel worms; high-capacity roller bearings.

ASK OUR FIELD ENGINEERS to help you with your application problems. They will specify the speed reducer that *exactly* matches your needs. With industry's most *complete* range of types and sizes to work with, their recommendations are unrestricted, unbiased. Contact your nearest Link-Belt office or authorized stock-carrying distributor. Ask for Book 2824. 15,677

LINK-BELT

SPEED REDUCERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13) South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World.

For more facts Circle 427 on Reader Service Card

ONE OF THESE NEW GE MANAGEMENT CONTROL

New GENERAL ELECTRIC SHOPTROL *System monitors individual work stations...displays production status at a control center for timely reactions to factory conditions.*

The GE SHOPTROL SYSTEM is a factory monitoring and data collection system that monitors work stations and records production data at a central point. Each work station's status is visually displayed on a Status Monitor. Status Monitors present a panoramic view of up-to-the-minute factory conditions for visual display at the Production Control Center. Work stations have an operator control station, or an alarm station terminating at the Control Center. Depending on complexity of communication needed and data to be transmitted, a paging selector may be added to each work station.

The Shoptrol System records, in hundredths of hours, time elapsed for operations, set-up and tear down, unavoidable delays, machine running, and machine off conditions. The Shoptrol System can record time elapsed, or count pieces or operations.

The Shoptrol System provides direct signal communications from work stations to the Production Control Center. The operator control station and paging selector have phone jacks to provide entry into the telephone intercom. Units are ruggedly built for dependable life in factory conditions.

Totals recorded from the Status Monitors at the end of shift produce information for production control analysis and management decision making. The data is readily convertible to punched cards or paper tape for input to a data processing system. For more information, write for brochure CPB-152, General Electric Company, Computer Department, Section 90V8, Phoenix, Arizona, or your District Office listed below.

THE GE SHOPTROL SYSTEM CONTRIBUTES TO GREATER PRODUCTION EFFICIENCY BY:

...providing constant communication between production control center, foreman, and work station operators.
...collecting and displaying current production data for each work station.
...increasing accuracy of production records.
...providing immediate production status for management at all times.

Atlanta: 270 Peachtree St. N.W., 522-1611 • **Boston:** 140 Federal St., HU 2-1800, Ext. 311 • **Chicago:** 120 S. La Salle St., 782-5061 • **Cleveland:** 215 Euclid Ave., SU 1-6822 • **Dallas:** 3200 Maple Ave., RI 8-0589 • **Detroit:** 680 Antoinette St., TR 2-2600 • **Houston:** 4219 Richmond Ave., MO 7-3301 • **Kansas City, Mo.:** 106 W. 14th St., GR 1-2919 • **Los Angeles:** 1010 S. Flower St., DU 1-3641 • **Louisville:** Bldg. 6, Appliance Pk., GL 4-7511 • **Minneapolis:** Plymouth Bldg., 6th & Hennepin, FE 2-7569 • **New York:** 122 E. 42nd St., PL 1-1311, Ext. 3205 • **Philadelphia:** 3 Penn Center Plaza, LO 8-1800 • **Phoenix:** Guaranty Bank Bldg., 3550 N. Central Ave., AM 4-3741-2 • **Pittsburgh:** 1634 Oliver Bldg., Mellon Sq., AT 1-6400, Ext. 566 • **San Francisco:** The Russ Bldg., 235 Montgomery St., DO 2-3740 • **Schenectady:** Bldg. 2, 1 River Rd., FR 4-2211, Ext. 5-4405 • **Seattle:** Dexter Horton Bldg., 710 Second Ave., MA 4-8300 • **St. Louis:** Paul Brown Bldg., 818 Olive St., GE 6-4343 • **Syracuse:** 1010 James St., GR 6-4411, Ext. 6141 or 6142 • **Washington, D.C. Area:** 7401 Wisconsin Ave., Suite 514, Bethesda, Md., OL 2-8100.

SYSTEMS WILL SAVE YOU MONEY THIS YEAR

New GE 3101 DATA ACCUMULATION and COMMUNICATION *System provides immediate plant/office data communication...as a management tool to increase production and reduce costs.*

The GE 3101 is General Electric's answer to the need for an economical and effective means of collecting operational data. Key areas such as purchasing, receiving, quality control, shop operations, warehouse, shipping, etc., send current data to a central point for collection and display. Each of the key areas has a Collector that sends data to the Accumulator, where it is punched into paper tape for a permanent record. Data originating at the Collector is from punched cards and/or 19 variable dial settings. Collectors may be up to 10,000 feet from the Accumulator.

The punched paper tape can produce a typewritten copy immediately for visual display of current conditions; can be converted to punched cards; or can be used for direct input to a computer system. Investigate this new, lower cost development by General Electric.

Installation of the GE 3101 information gathering system can result in greater operational profits due to: accuracy and timeliness of data, economy of operation, and quicker access to the facts for well informed decisions by management.

For more information, write General Electric Company, Computer Department, Section 90V8, Phoenix, Arizona, or contact your nearest General Electric Computer Department District Office listed below.

In Canada: Canadian General Electric Co., Ltd., Electronic Equipment and Tube Dept., 830 Lansdowne Ave., Toronto, Ontario, Canada. **Outside U.S.A. and Canada:** Producer Goods Export Department, International General Electric Company Division, 150 East 42nd Street, New York City, N.Y., U.S.A.

INFORMATION PROCESSING AUTOMATED BY GENERAL ELECTRIC

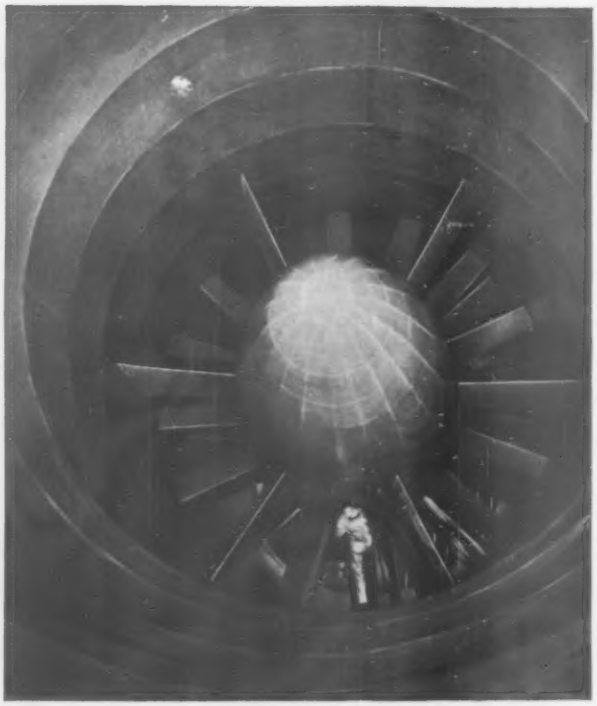
Progress Is Our Most Important Product

GENERAL ELECTRIC

CPA 90 (7-61)

For more facts Circle 428 on Reader Service Card

SUN CUTTING OIL SAVES SIX WAYS. A typewriter manufacturer was producing pins, fasteners, and other parts from Bessemer screw stock on Brown and Sharpes and New Britain Gridleys. Finishes were poor, production slow, tool life below average. Work from cut-off was too hot to handle and there was excessive smoking. Analysis showed the cutting oil was deficient in antiweld and lubricity. Sunicut 11 Cutting Oil was recommended and its use resulted in immediate improvement in all trouble areas. In addition . . . savings on oil cost alone ran $6300 a year, proof that Sun quality does not mean a premium price!



SWITCH TO A SUN GREASE STOPS TROUBLE! A system of delicately balanced propellers produces the big wind in this huge transonic wind tunnel. Control mechanisms at the roots of the blades consist of several small sets of spur gears, antifriction bearings on gear shafts, and four 10-inch antifriction thrust bearings. *Oil* was being used for lubrication, but oil leaked . . . caused unbalance, violent vibration, gear and bearing failures. Sun 1897 *Grease* was recommended. An assembly was packed; leakage stopped. After 18 months, the Sun grease was still in service; not one bearing or gear failure had occurred!

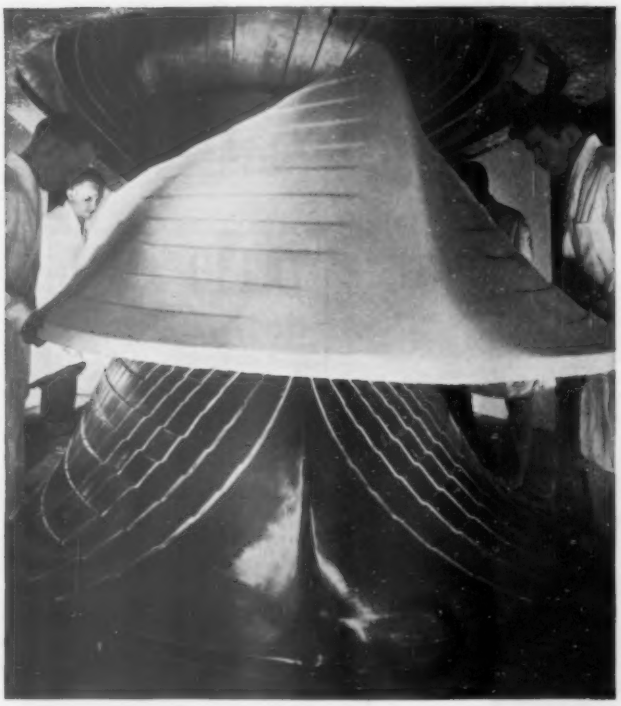
Are you stymied by the question:

SUNOCO

QUALITY . . .
THE BEST ECONOMY OF ALL

Actually,
the answer is
simple enough:

SUN OIL COMPANY



HYDRAULIC OILS, SUNOCO SERVICE CUT LOSS! A molder of fiber glass products operates several plants. In one, leakage was causing frequent downtime of six presses molding fiber glass trays. A Sun man analyzed the trouble, recommended Suntac 302, one of the many Suntac oils designed to combat leakage in hydraulic and circulating systems. At another plant, production of boat hulls like the one shown here was stymied by a contaminated oil. The Sun man swung into action . . . brought in equipment to salvage the oil, saving a sizeable sum through *service*. Now job-fitted Sun Solnus 300 is *keeping* production rolling!

SOLNUS OIL CUTS MAINTENANCE 50%! A Pennsylvania manufacturer compared performance of his regular compressor oil with Sun Solnus 300 in a Chicago Pneumatic air compressor for two rigid test periods of eight months each. The Solnus 300 cut discharge valve maintenance from 4.12 manhours per month to 1.82, intake valve maintenance from 5.68 to 3.00, and all valve maintenance from 9.87 to 4.87 . . . maintenance savings of 50%. Dollar savings ran a tidy $915 a year! Where can your Sun Representative help you save with the quality performance of the right job-fitted Sunoco product for you?

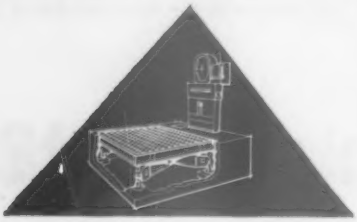
Which petroleum product?

Get the *product quality* it takes to keep you rolling . . . job-fitted by men who *know what they're doing* . . . teamed with the *service* you have a right to expect! Try a Sunoco product in your plant. It's the fastest way to convince yourself that investing in Sun quality can be good for you.

PHILADELPHIA 3, PA., DEPT. F-8 • **In Canada, Sun Oil Company Limited, Toronto and Montreal.**

...CUT COSTS AND SAVE TIME WHEN WEIGHING MATERIALS ON POWER OR HAND TRUCKS

FAIRBANKS-MORSE WAREHOUSE SCALES



Self-Contained Scales

- For general use in factories, warehouses, shipping rooms, foundries, paper mills and other industrial applications.
- Thirty different models for your special requirements . . . with direct-reading "Floaxial" Dials, with or without "Printomatic" weight recorder or with Double Beam. Capacities from 600 lbs. to 3200 lbs.
- All models feature the F-M Type "S" Lever System—a suspension system that swings parallel to the direction of traffic . . . thus protects scientifically ground pivots and bearings . . . results in accuracy that lasts for longer periods of time.

Built-In Floor Scales

- Especially designed for heavy-duty use in metal working plants, steel mills, paper mills, textile mills, mines . . . and for general factory use.
- Available for installation in a pit or suspended from the floor, with direct-reading "Floaxial" Cabinet Dial, with or without "Printomatic" weight recorder, or Double Beam. 20 different models with capacities up to 10 tons.
- All models feature the F-M Type "S" Lever System for complete accuracy over longer periods of time.

For complete information on any or all Self-Contained and Built-in Scales, write: **C. G. Gehringer, Marketing Director, Scale Division; Fairbanks, Morse & Co., 100 Electra Lane, East Station; Yonkers, New York.**

FAIRBANKS MORSE

A MAJOR INDUSTRIAL COMPONENT OF

FAIRBANKS WHITNEY

For more facts Circle 430 on Reader Service Card

Circle 431 on Reader Service Card for items on next page

Something NEW...
designed for your convenience

Adjustable From 1 to 15 Seconds

This new Allen-Bradley development should solve such occasional problems where, upon the operation of the push button or limit switch, a slight time delay should occur. Time delay is adjustable up to 15 seconds—and it can also be introduced when "stopping" the operation—but not in both the "starting" and "stopping" cycle.

Both push button and limit switch are relatively low in cost—ideal for applications where a delay of only a few seconds is desired, and where the repetitive accuracy of the Allen-Bradley Bulletin 849 time delay relay is not necessary. Both units have single pole, double break contacts—either normally open or normally closed. They are no more difficult to install than the corresponding units without the time delay feature.

Machine tool and production system designers should have full information in their files on these new Allen-Bradley time delay push buttons and limit switches. It is yours for the asking. Write today.

12-61-RM

ALLEN-BRADLEY

Member of NEMA

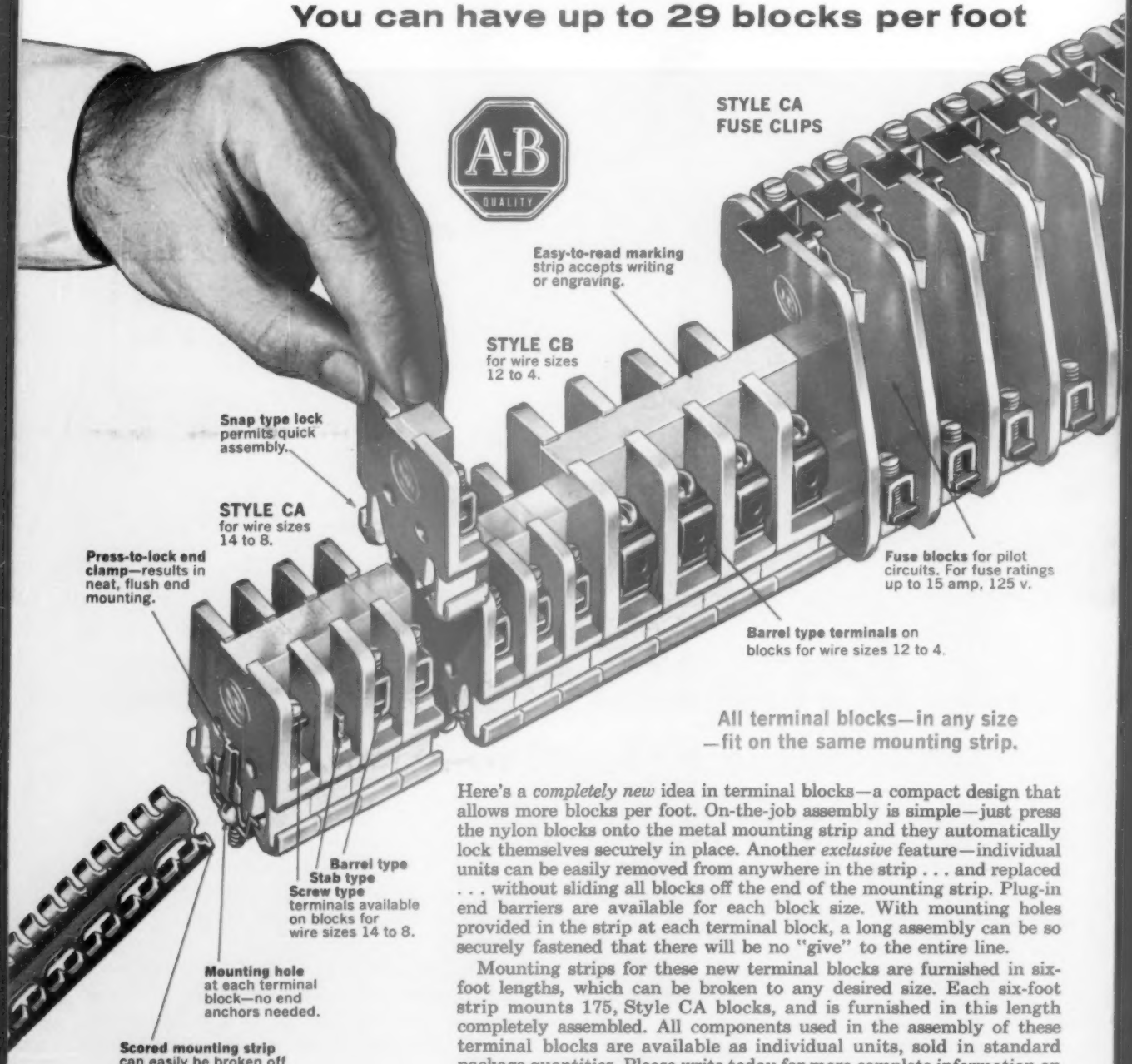
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL

New ALLEN-BRADLEY BULLETIN 1492 SNAP-ON TERMINAL BLOCKS

save space

You can have up to 29 blocks per foot


STYLE CA
FUSE CLIPS
A-B
QUALITY
Easy-to-read marking strip accepts writing or engraving.
STYLE CB
for wire sizes 12 to 4.
Snap type lock permits quick assembly.
STYLE CA
for wire sizes 14 to 8.
Press-to-lock end clamp—results in neat, flush end mounting.
Fuse blocks for pilot circuits. For fuse ratings up to 15 amp, 125 v.
Barrel type terminals on blocks for wire sizes 12 to 4.
Barrel type
Stab type
Screw type
terminals available on blocks for wire sizes 14 to 8.
Mounting hole at each terminal block—no end anchors needed.
Scored mounting strip can easily be broken off —without tools—at any desired length.

All terminal blocks—in any size —fit on the same mounting strip.

Here's a *completely new* idea in terminal blocks—a compact design that allows more blocks per foot. On-the-job assembly is simple—just press the nylon blocks onto the metal mounting strip and they automatically lock themselves securely in place. Another *exclusive* feature—individual units can be easily removed from anywhere in the strip . . . and replaced . . . without sliding all blocks off the end of the mounting strip. Plug-in end barriers are available for each block size. With mounting holes provided in the strip at each terminal block, a long assembly can be so securely fastened that there will be no "give" to the entire line.

Mounting strips for these new terminal blocks are furnished in six-foot lengths, which can be broken to any desired size. Each six-foot strip mounts 175, Style CA blocks, and is furnished in this length completely assembled. All components used in the assembly of these terminal blocks are available as individual units, sold in standard package quantities. Please write today for more complete information on these new "spacesaving" Bulletin 1492 terminal blocks.

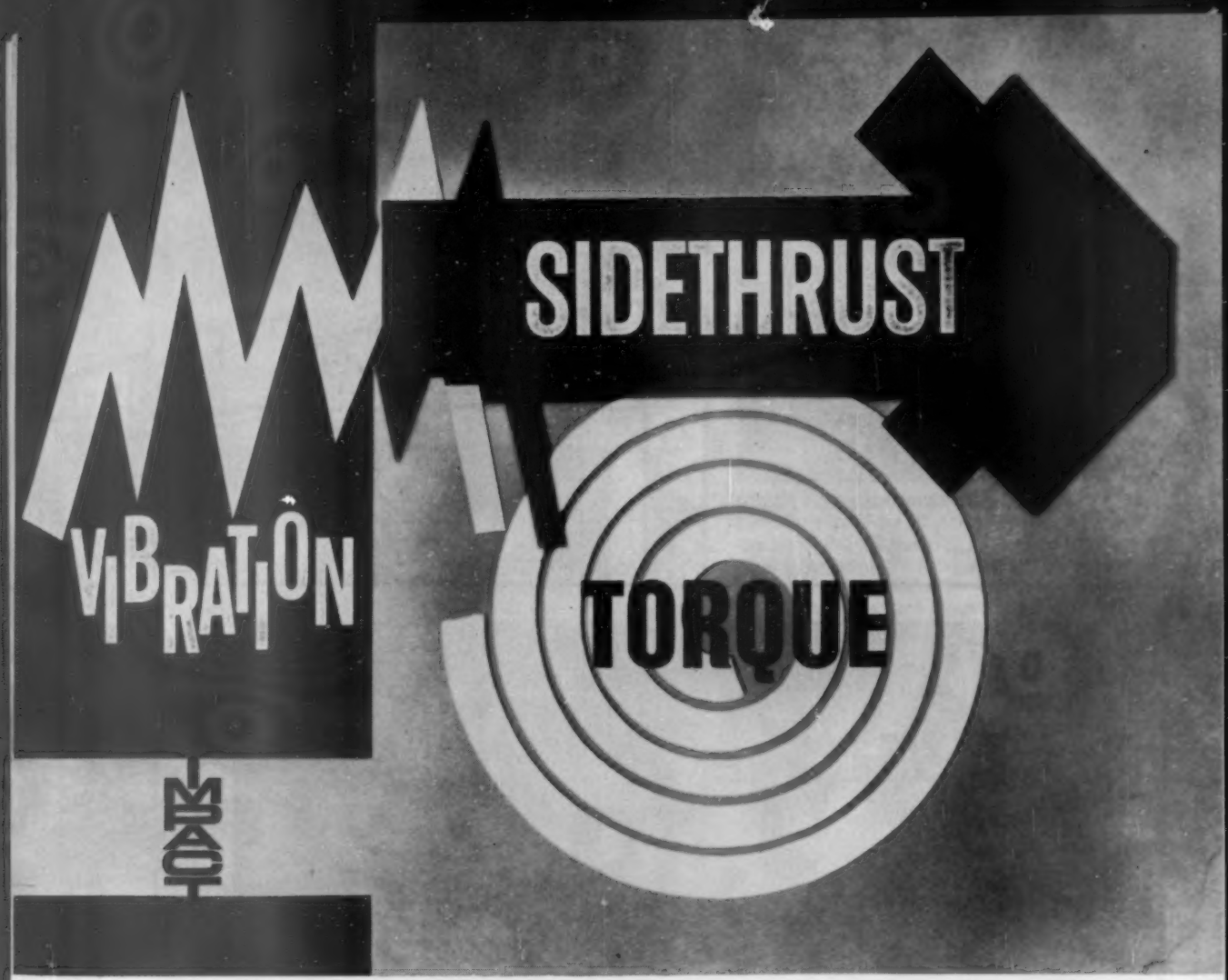
12-61-RM

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL



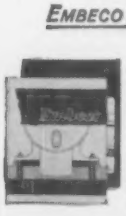
When you grout heavy equipment, remember:

EMBECO GROUT STANDS UP BEST AGAINST THESE OPERATING FORCES BECAUSE EMBECO IS NON-SHRINK

Plain grout shrinks . . . leaves only a thin web of mortar (and the shims) that frequently fails to adequately support the baseplate under the pounding of these powerful operating forces. Result: mis-alignment . . . a costly, short-life grout.

EMBECO grout is non-shrink . . . flows easily into place . . . gives full support of baseplate. EMBECO grout is tough, high strength, oil resistant. Result: maintains alignment . . . a tight, long-life grout.

EMBECO grouts for good. It's the choice of leading heavy equipment manufacturers because of its outstanding performance record.



Before you grout another piece of heavy equipment—write for full information on the benefits you can get with EMBECO Non-Shrink Grout.

The Master Builders Company
Cleveland 18, Ohio
Division of American-Marietta Co.
World-wide manufacturing and service facilities

MASTER BUILDERS. EMBECO*

*EMBECO is a registered trademark of The Master Builders Co. for its specially prepared, flowable, non-shrink grouting products.

For more facts Circle 432 on Reader Service Card

AT THE HEART OF INDUSTRY...

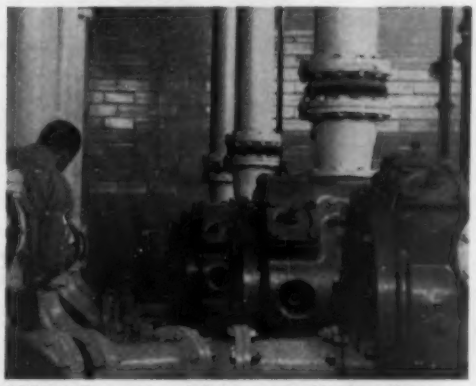
The only hose built like a tire, U. S. Royal Cord Air Hose amazed builders of a large aluminum plant in Texas by its ability to withstand abuse. Lying unprotected on a road surfaced with abrasive sea shells, the hose was continually run over by heavily loaded trucks and even 50-ton cranes — showed no damage even when carrying 125 pounds pressure! Little wonder users have made US the world's largest manufacturer of hose.

H 108

Whatever the time, the place, the industry, or its size . . . odds are you'll find US there. As the world's largest manufacturer of industrial rubber products, U. S. Rubber knows not only the needs of industry, but the answers to those needs. And industry knows US for it.

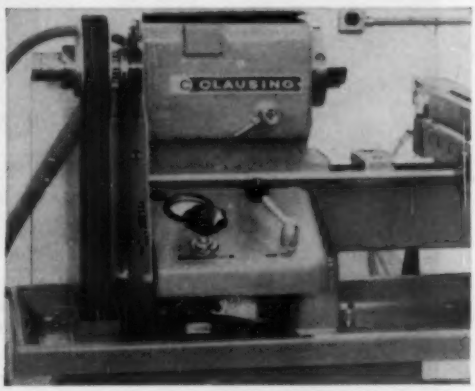
Eliminating pile-ups and product waste for American Can, U.S. SteepGrade Conveyor Belts carry light, smooth-finished cartons down a 45° incline. An exclusive, molded gripper cleat construction gives safe, positive control even at extreme angles that require an absolute minimum of floor space. Uphill, down, or cross country, there's an experience-engineered US Conveyor Belt for every moving need.

CB 102



655 US Expansion Joints serve Cincinnati sewage plant. Installed in the Mill Creek Sewage Works, one of five plants that will treat 120 million gallons of sewage daily, US Expansion Joints are used exclusively between the pumps and long runs of heavy cast-iron pipe to allow for expansion and contraction, protect against vibration, and keep damaging weight off the pumps.

EJ 101



The abuse of continual starting and stopping was no problem for the U.S. Royal V-Belts used on this Clausing semi-automatic boring and turning lathe. These belts were selected because they ran cool, took little space, were exceptionally high in power-transmission efficiency. They proved to be the most uniform and smoothest running of many belts tested.

VB 105

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

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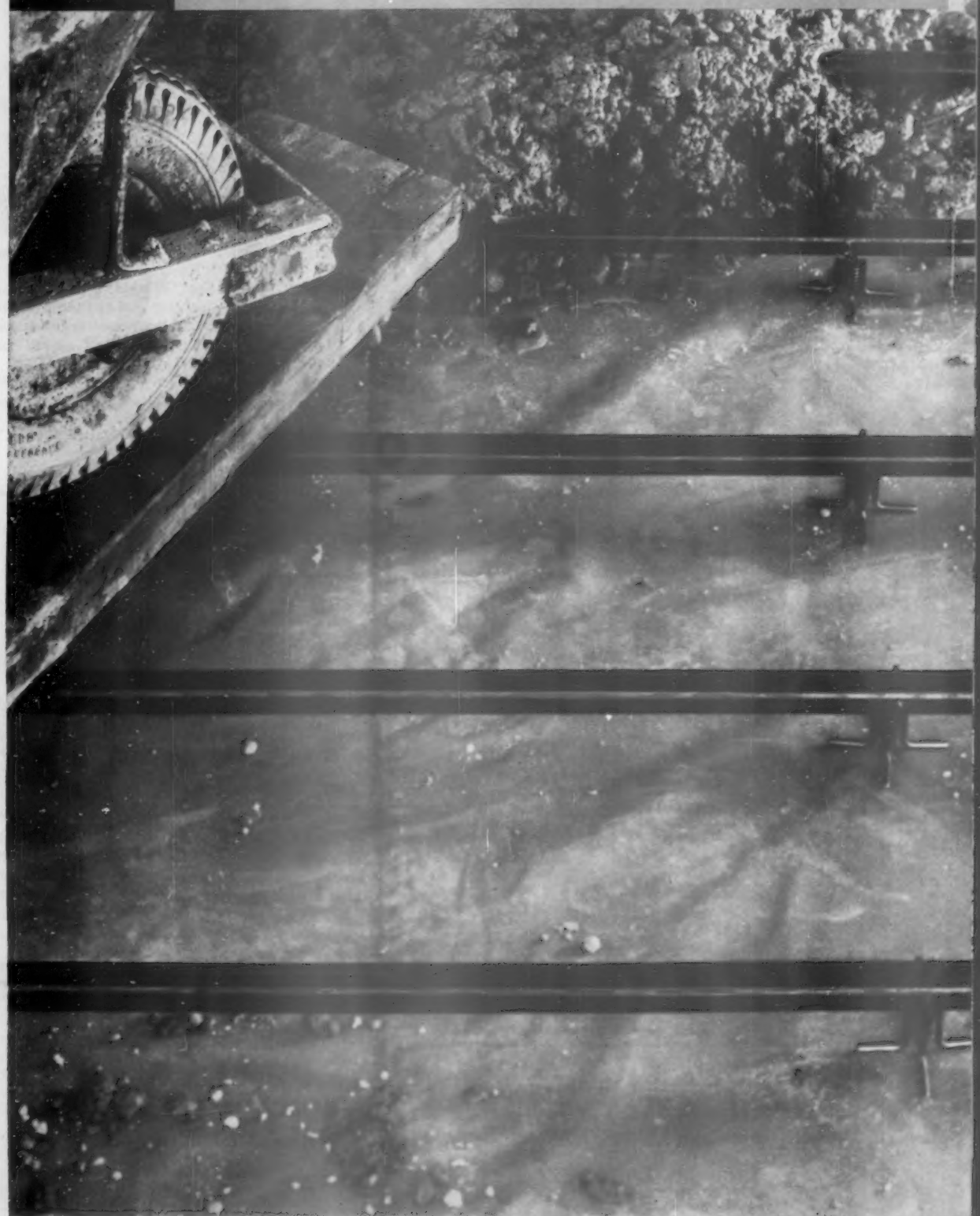
STEEL PIPE BY WHEELING



So easy to use... so hard to abuse!

Bend it . . . bang it . . . bury it under tons of concrete! Rugged Wheeling CW Steel Pipe takes such torture in stride. Then keeps on taking it long after most other pipe has failed!

Long experience under a wide range of conditions has proved that Wheeling Pipe has the strength and dependability needed for economical service and continued safe use for years to come.

Wheeling Pipe can withstand amazing abuse. That's because it makes full use of steel's inherent strength and dimensional stability . . . and it's always produced under exacting *American* quality standards.

It's easy to use and handle, too. Made of uniform steel — Wheeling Pipe has even wall thicknesses and accurate circumferences. So this rugged pipe cuts easily . . . bends smoothly . . . welds surely.

Ask your Wheeling man about Wheeling CW Steel Pipe, both black and galvanized. Or write to Wheeling Steel Corporation, Wheeling, West Virginia.

WHEELING STEEL

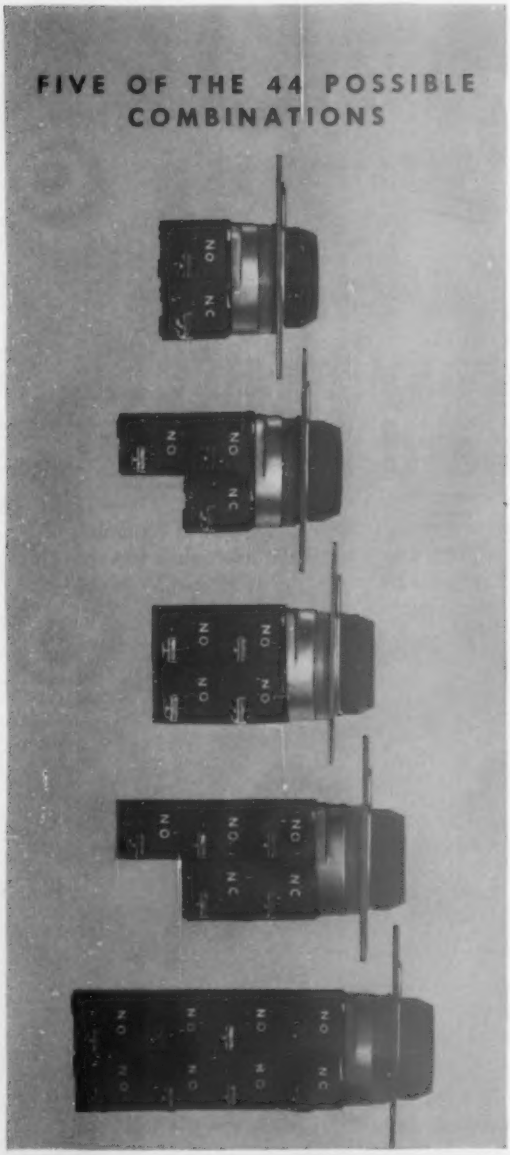
WHY WHEELING STEEL PIPE IS FIRST CHOICE!

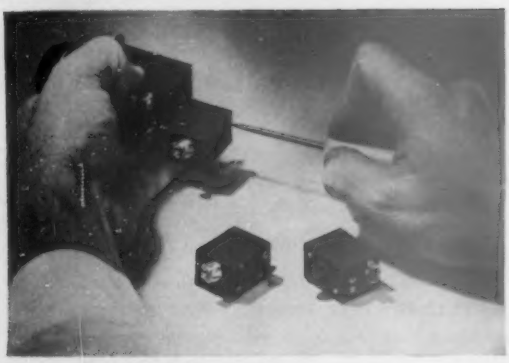
- *Lowest cost with durability*
- *Strength unexcelled for safety*
- *Formable — bends readily*
- *Weldable — easily, strongly*
- *Threads smoothly, cleanly*
- *Sound joints, welded or coupled*
- *Grades, finishes for all purposes*
- *Available everywhere from stock*

ALWAYS INSIST ON PIPE MADE IN THE USA!

WHEELING STEEL CORPORATION · IT'S WHEELING STEEL!

District Sales Offices at Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling





EASY INSTALLATION on a standard operator is possible because blocks are interchangeable. Two captive screws fit into internally threaded screwheads of previous unit to hold block assemblies securely.

NEW

Single-circuit Contact Blocks for General Electric Heavy Duty Oil-tight Push Buttons

ACTUAL SIZE

- **BUY ONLY THE CIRCUITS YOU NEED**
- **CONTROL UP TO 8 CIRCUITS IN ANY COMBINATION OF NO–NC**
- **CONTACT BLOCKS ARE EASY TO MOUNT**

It is no longer necessary to pay for unused circuits in oil-tight push buttons. Now General Electric offers you the savings and flexibility of "single-circuit" contact block design for oil-tight push buttons.

Separate normally open and normally closed blocks are available for mounting with standard G-E oil-tight operators. This means, for example, that if you require two NO and one NC circuits, you can buy this exact combination where formerly you had to use two blocks—each with one NO and one NC contact.

Up to eight blocks may be mounted with a standard operator in *any* combination up to eight NO or eight NC.

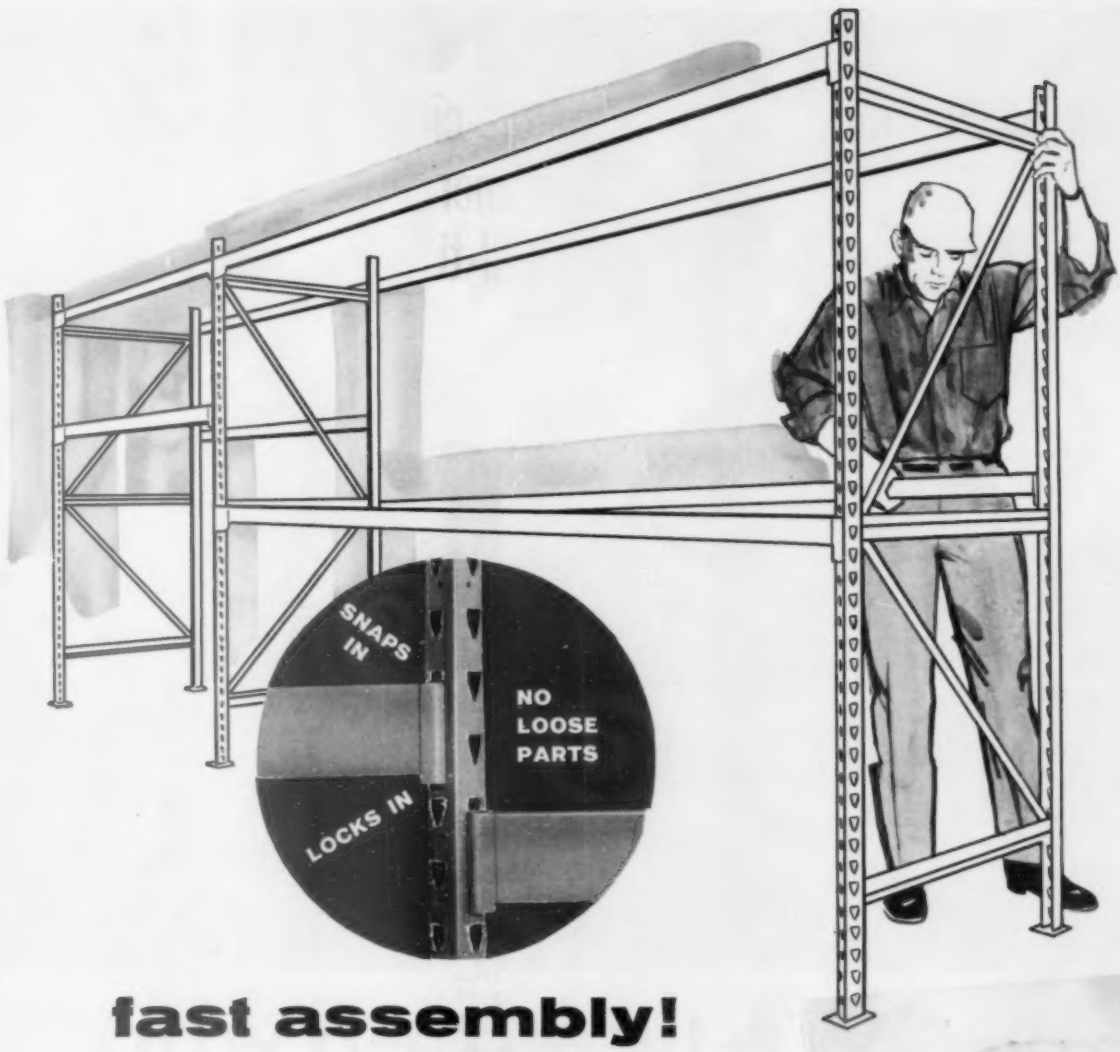
Since the new block is offered in addition to General Electric's standard block, and is interchangeable with it, you now have even greater flexibility with the G-E oil-tight pushbutton line.

Specify General Electric heavy duty oil-tight push buttons for your machines or panels, and take full advantage of the savings possible with the new single-circuit contact block. For more information, call your nearby G-E sales engineer or distributor, or write Section 813-37, for Publication GEA-7320. General Electric Co., Schenectady 5, N. Y.

You get **MEASURABLE ADVANTAGES** with **GENERAL ELECTRIC CONTROL**

Progress Is Our Most Important Product

GENERAL ELECTRIC



fast assembly!

EMI *air-row head pallet racks*

only 2 basic parts—fast assembly—easy to relocate.

EMI *air-row head DRIVE-IN RACKS*
EMI *air-row head DRIVE-THRU RACKS*

These strong, efficient, space-saving racks are all engineered on the AIR-ROW Head principle with basic interchangeable parts.

EQUIPMENT MFG. INC.

21561 HOOVER ROAD • DETROIT 5, MICHIGAN

Before you build, remodel or add to a storage area, FIND OUT ABOUT AIR-ROW HEAD RACKS

WRITE FOR DETAILED INFORMATION

YOU CAN STACK ANYTHING ON **EMI** RACKS

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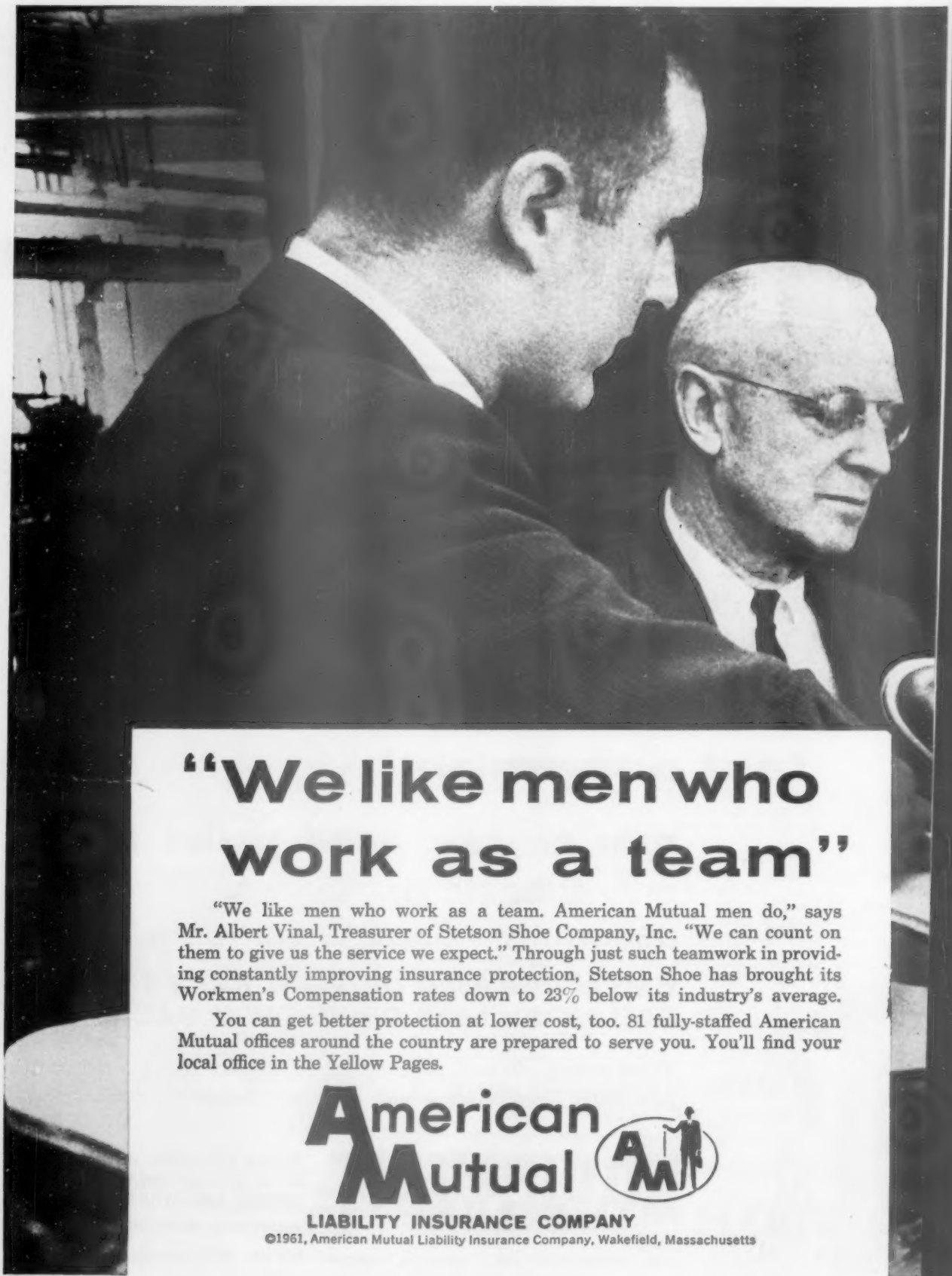


"We like men who work as a team"

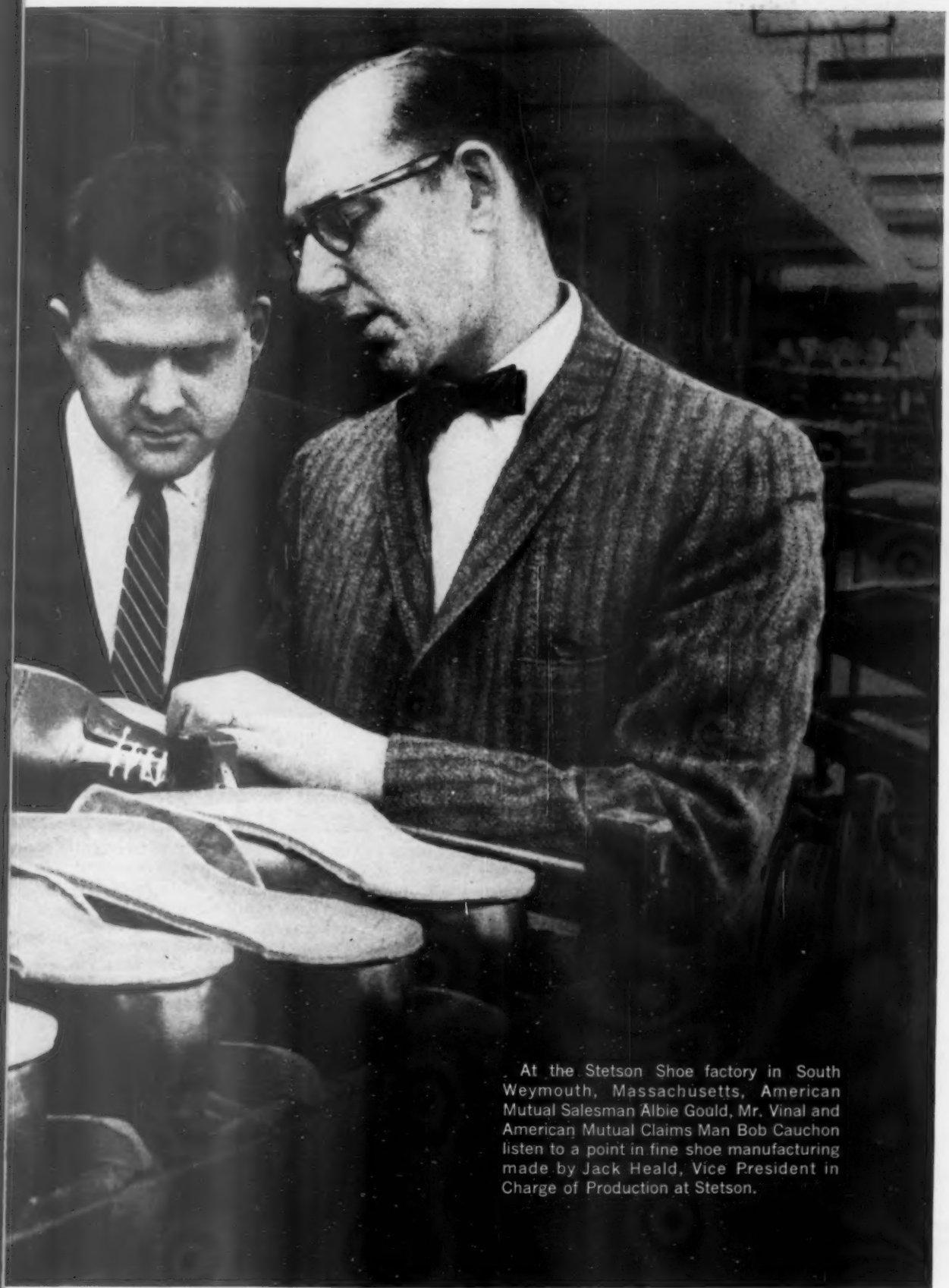
"We like men who work as a team. American Mutual men do," says Mr. Albert Vinal, Treasurer of Stetson Shoe Company, Inc. "We can count on them to give us the service we expect." Through just such teamwork in providing constantly improving insurance protection, Stetson Shoe has brought its Workmen's Compensation rates down to 23% below its industry's average.

You can get better protection at lower cost, too. 81 fully-staffed American Mutual offices around the country are prepared to serve you. You'll find your local office in the Yellow Pages.

American Mutual

LIABILITY INSURANCE COMPANY

©1961, American Mutual Liability Insurance Company, Wakefield, Massachusetts



At the Stetson Shoe factory in South Weymouth, Massachusetts, American Mutual Salesman Albie Gould, Mr. Vinal and American Mutual Claims Man Bob Cauchon listen to a point in fine shoe manufacturing made by Jack Heald, Vice President in Charge of Production at Stetson.

HOW TO SAVE TAX DOLLARS THESE DAYS

Profit these days always has to be concerned with the phrase "after taxes." At a large process plant sewage taxes were being paid on the basis of all water consumed. But a sizable portion of this water was actually used as "raw material" for finished products and never reached the sewage lines. A Rockwell engineer suggested putting liquid meters* on process units to accurately record the water consumed in production. By proving that large quantities of water going into the plant were not discharged as waste, sewage tax bills were cut drastically.

This is just one example of the many ways a Rockwell field engineer can help you track down new and different ways to cut plant costs with measurement and flow control devices. Rockwell has more experience than any other single source for this kind of cost cutting. That's because Rockwell, as the world's largest manufacturer of a complete line of meters, valves and regulators, has been asked to solve more problems.

Wherever liquids, gases or slurries flow through pipes in your plant, you probably can save time, money or materials with new or improved methods of measurement and control. It's easy to find these cost cutting opportunities—just have a Rockwell field engineer visit your plant by sending in the coupon today.

* *Rockwell makes meters to measure a variety of liquids—water, oil, chemicals and other industrial fluids.*

ROCKWELL

The leading single source for Measurement/Control products and ideas

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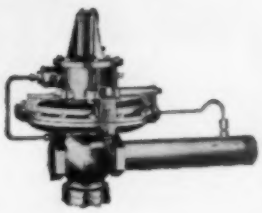
"IN-PLANT" METERING:

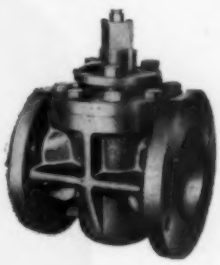
LIQUIDS AND GASES

Rockwell gas and liquid meters, properly applied, can improve quality control, sharpen cost control, and prevent waste in almost every plant department. A Rockwell Field Engineer can help you find *where* meters will cut costs . . . and Rockwell has a complete line of meters to measure practically anything that will flow through pipe.

CONTROLLING PIPED MATERIAL:

LIQUIDS AND GASES





More efficient control of all the material flowing through pipes in your plant is a positive step in cutting costs. There are new applications and new ideas for using gas pressure regulators and valves that will stop wasteful, inefficient, and dangerous handling of fuels, production fluids, and products. A Rockwell Field Engineer can show you *where* and *how*.

HOW MUCH COULD YOU SAVE?

There is hardly a plant anywhere—including yours—where the right application of the right measurement and control methods and equipment won't produce savings many times the modest cost involved. Certainly it's worth investigating—especially since it will cost you nothing to find out. Simply mail the coupon now.

SEND COUPON TODAY

MEASUREMENT AND CONTROL DEVICES

all fine products by

ROCKWELL

Rockwell Manufacturing Company, Dept. MC1H, Pittsburgh 8, Pa.

Please send me literature as checked:

- ☐ Valving gas, liquids and slurries. Bulletin V-621
- ☐ Measuring gases. Bulletin 1085
- ☐ Regulating gas pressures. Bulletins 1044, 1059, 1082, 1086
- ☐ Measuring liquids. Bulletins P-100, PI-666, OG-400
- ☐ Condensed catalog of all products. Bulletin C-5000
- ☐ Please have your Field Engineer call.

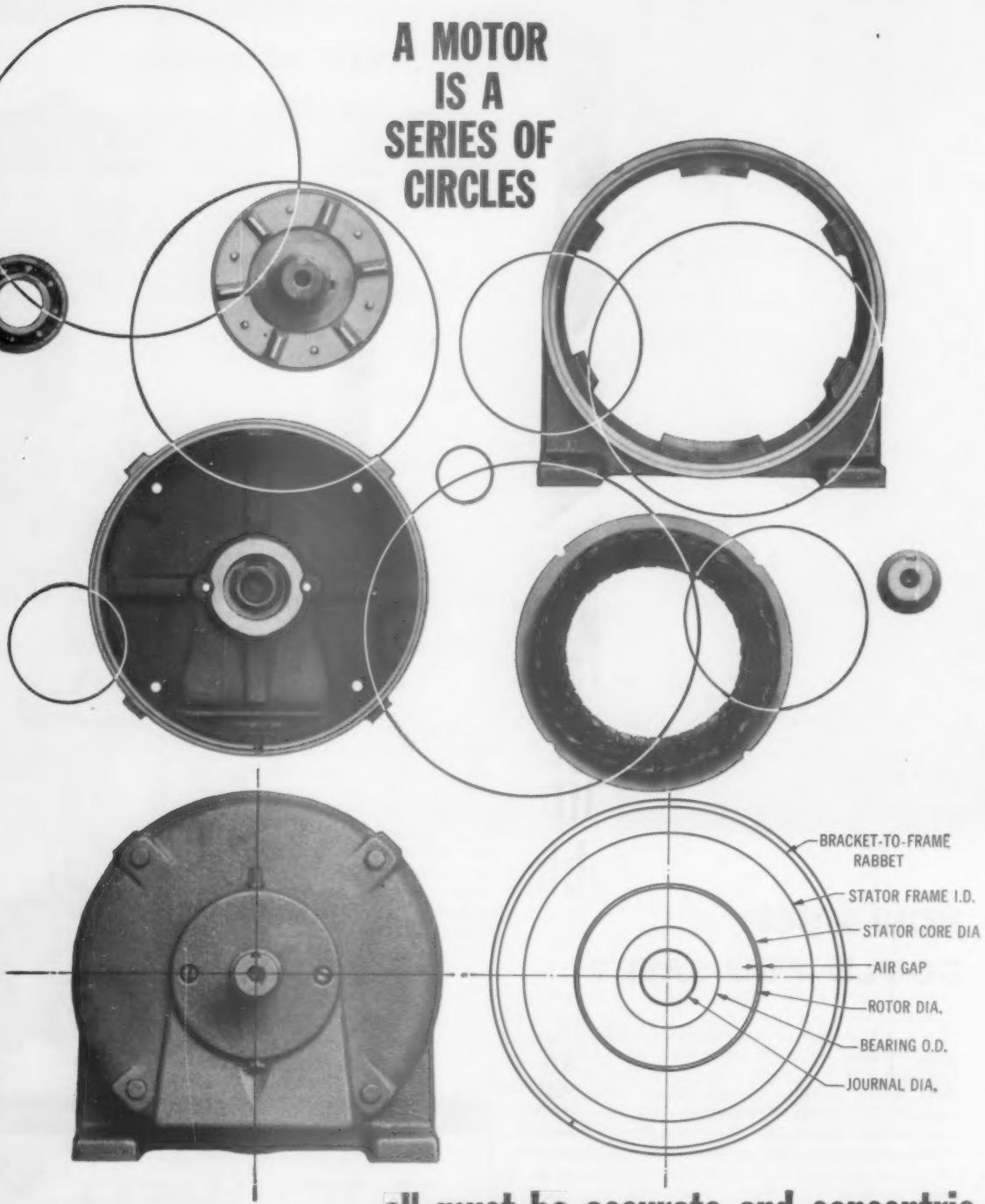
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

A MOTOR IS A SERIES OF CIRCLES



all must be accurate and concentric

In manufacturing Elliott Crocker-Wheeler motors, a dozen critical "circles" are formed accurately and concentrically through unique and extraordinarily precise production methods. The result is exact alignment of all parts, true and uniform air gap, free-spinning rotor, quiet, cool, dependable operation.

■ *Elliott Crocker-Wheeler integral-hp a-c and d-c motors—from smallest to largest—are offered in all conventional enclosures and modifications; with insulation to suit the application, including* EPA SEAL *epoxy insulation for use where conditions are most severe.*

WI-3

ELLIOTT COMPANY

GENERAL OFFICES: JEANNETTE, PENNSYLVANIA

PLANTS AT: Jeannette and Ridgway, Pa.; Springfield, Ohio

TURBINES · GENERATORS · MOTORS · COMPRESSORS · TURBOCHARGERS · EJECTORS · STRAINERS · TUBE CLEANERS

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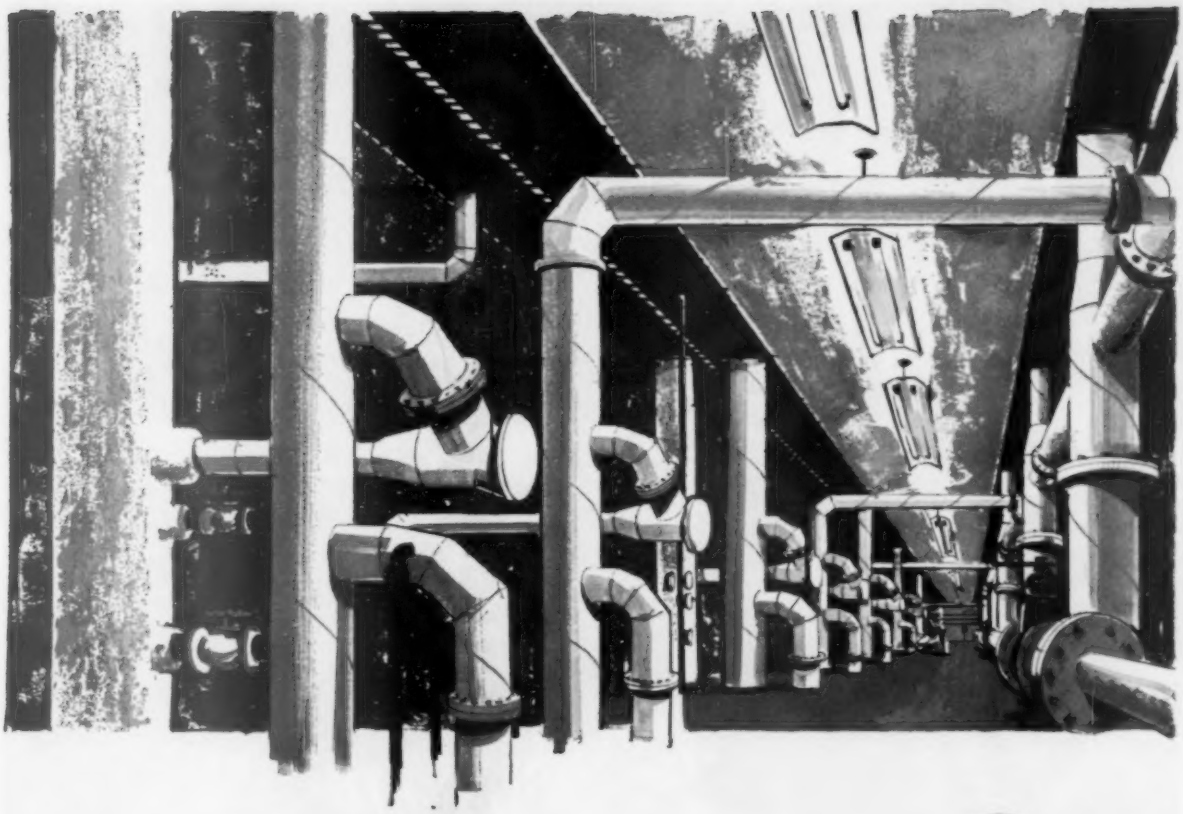
FACTORY



Armco Pipe Eliminates Plant Piping Problems At Every Turn

Steel — for strength, economy, durability

When you specify and use Armco Welded Steel Pipe for your plant piping, water supply or steam lines, you gain a unique advantage that can save money, installation time, and eliminate a source of possible maintenance. That advantage is the Armco "FITTING SERVICE." Wyes, tees, elbows and other standard and special fittings are supplied already attached to straight pipe sections. Everywhere your pipe line bends, you can save the cost and installation of at least one pipe joint. And, of course, where there is no coupling, there is no opportunity for a leak to develop.

Forty-Page Catalog Now Available

You'll find complete facts in the Armco Welded Steel Pipe Catalog for Industrial Uses. For your free copy, clip and use the handy coupon. **Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corporation, 6971 Curtis Street, Middletown, Ohio.**

ARMCO DRAINAGE & METAL PRODUCTS, INC.
Middletown, Ohio

Send my copy of the 40-page catalog on Armco Welded Steel Pipe for Industrial Uses.

☐ Have Armco Sales Engineer in my area contact me concerning a specific project.

NAME_____ TITLE_____

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ARMCO Drainage & Metal Products

Free kilowatts from the sun... delivered daily with non-glare Johns-Manville CORRULUX

The finest natural lighting your plant can have is the soft, diffused daylighting you get with Corrulux panels by Johns-Manville. These fiber glass reinforced translucent plastic panels will admit over 80% of the light striking them, depending on color, yet eliminate glare, spotlighting and harsh shadows because they diffuse light at all angles.

Corrulux is shatter-proof and splinter-proof. It works readily with hand or power tools. It comes in a wide variety of colors and sheet sizes, both corrugated and flat. Available corrugation dimensions match J-M Corrugated Transite and other standard building materials.

For further details, look in the Yellow Pages under *Plastics*, or write Johns-Manville, Box 158, Dept. FA-8, New York 16, N. Y. In Canada, Plastics and Allied Building Products, Ltd., Dundas, Ontario.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

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It's new and exclusive...

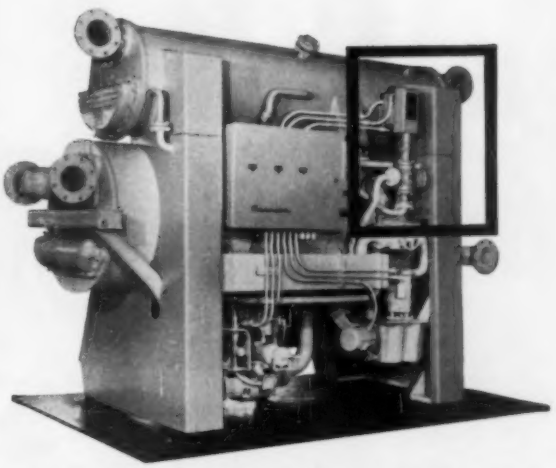
CARRIER SOLUTION CAPACITY CONTROL

with Automatic Absorption Refrigeration cuts operating costs to an all-time low!

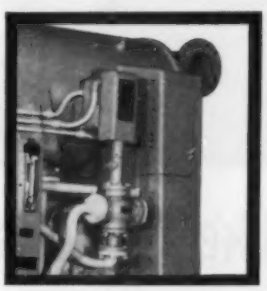
Through lower steam consumption per ton of refrigeration when working at partial load, Carrier Solution Capacity Control cuts operating costs. Since refrigeration equipment seldom works continuously at full load, the savings it effects can be substantial. With it, full advantage may be taken of the lowest possible steam rates. Results: Maximum economy and peak efficiency.

Two other advantages of Solution Capacity Control: (1) Steam pressure always remains constant. There's no need for manual or costly automatic steam control valves. (2) In addition to reducing steam consumption at partial loads, this Carrier development lowers the temperature of the condenser water leaving the machine and also eliminates bleeding of air into the condensate system. Results: Longer life, reduced water treatment requirements and few shutdowns.

Available for either electronic or pneumatic operation, Solution Capacity Control is now standard on all Carrier Automatic Absorption Liquid Chilling Packages. It can be installed with only minor adaptation at job-site on existing Carrier units. A Carrier representative will be glad to give you complete information about it. Write Carrier Air Conditioning Company, Syracuse 1, New York. In Canada: Carrier Air Conditioning Ltd., Toronto 14.



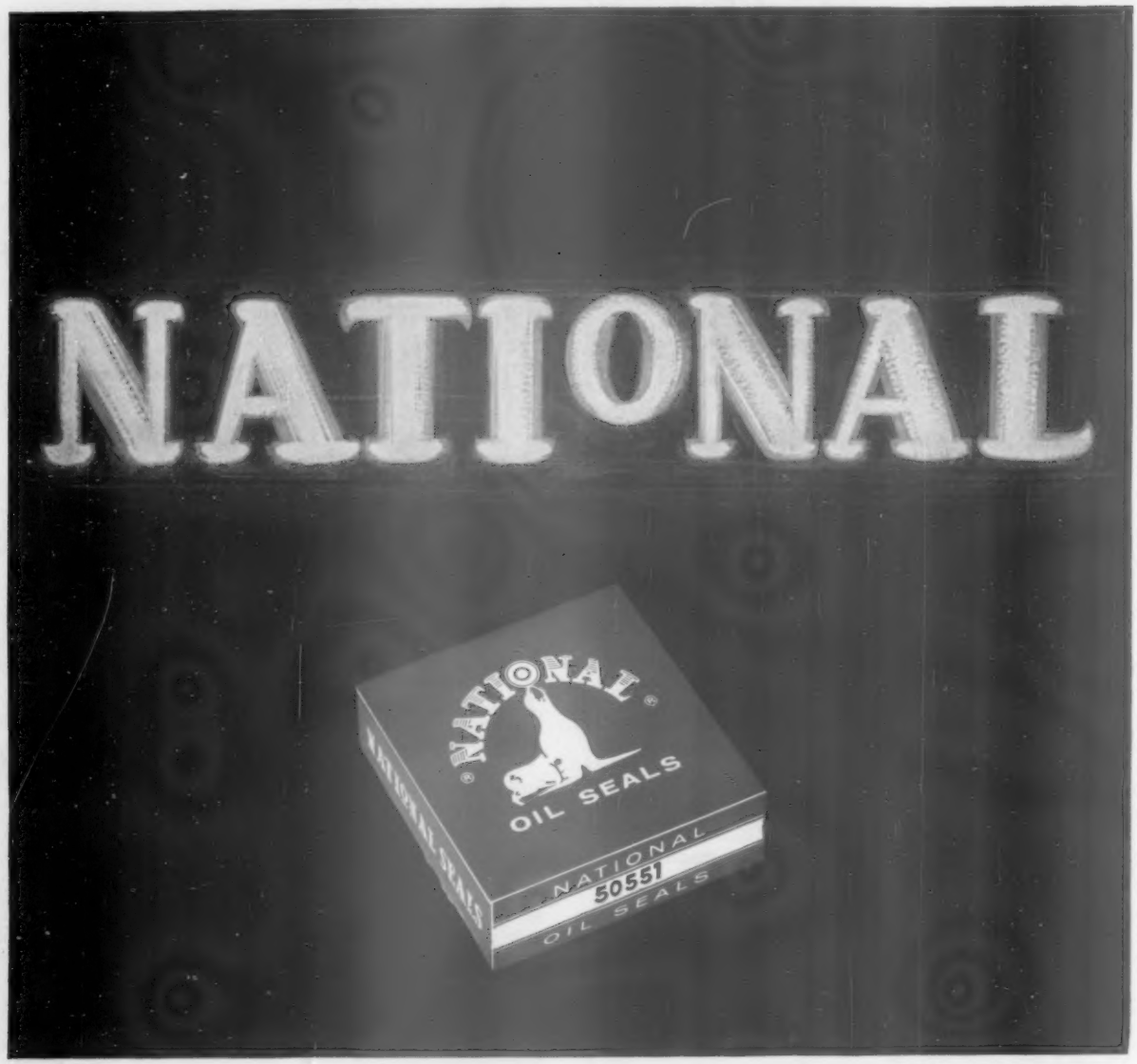
For air conditioning or process cooling, the Carrier Automatic Absorption Liquid Chiller uses low-pressure steam, high-temperature hot water or other hot liquids to produce refrigeration. Capacities: 50 to 1000 tons.



Solution Capacity Control System precisely controls machine output by reconcentrating only enough lithium bromide solution to handle the refrigeration load. When operating at partial capacity, the excess portion of full load solution is bypassed through the capacity control valve – positioned automatically in response to chilled water demands. Capacity control avoids all the additional heat loss which would accompany the unnecessary heating and cooling of the solution.

Carrier Air Conditioning Company

Better products, *faster*, from your National Seal distributor:



A name like National doesn't just happen

Years of experience and progress in engineering, designing and testing have developed a superior product to make National *the* name in oil seals. What does this mean to you? You get prompt delivery on National Seals from stock or special order, whenever you need them. A National Seal specialist will help you set up a working service stock so new seals will always be available to replace used seals. And your National Seal specialist will keep your inventory balanced for greater efficiency.

Insure uninterrupted protection for all your bearings. Ask your Bearing Specialist to recommend the proper seal for your needs. Call him today.

NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

For more facts Circle 443 on Reader Service Card

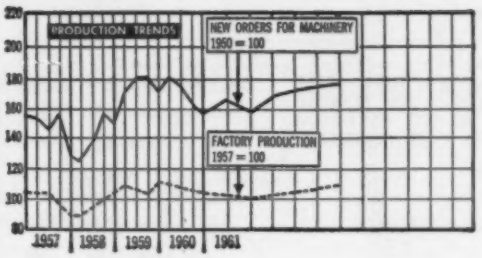
LOOKING AHEAD IN BUSINESS

A FACTORY PRESS TIME REPORT

FACTORY FIGURES OF THE MONTH

Indicator	JUNE[p] 1961	MAY[r] 1961	JUNE 1960
New Orders for Machinery (exc. elec.)[1]	178.0	176.0	176.0
Contracts for Industrial Construction[2]	111.0	127.0	154.0
Factory Production[3]	110.0	108.0	110.0
Consumers' Prices (cost of living)[4]	127.6	127.4	126.5
Industrial Prices (materials, supplies)[4]	127.6	127.8	128.2
Manufacturing Employment (millions)[4]	16.0	15.9	16.5
Total Employment (millions)[5]	53.1	52.7	53.1
Unemployment (millions)[5]	5.6	4.8	4.4

p = preliminary r = revised



Sources: 1. McGraw-Hill Dept. of Economics (1950 = 100); 2. Engineering News-Record (1950 = 100); 3. U. S. Federal Reserve Board 1957 = 100); 4. U. S. Dept. of Labor, Bureau of Labor Statistics (1947-49 = 100); 5. U. S. Dept. of Labor, Bureau of Labor Statistics.

Optimism continues despite war talk

THE OUTLOOK | **Output, employment, personal incomes appear certain to continue climbing to record levels. Tense world situation could hike prices, create a dangerous inflationary trend. Most experts bet it will not.**

As fall approaches, something more than recovery to the peak levels of 1959-60 is in prospect. But economic trends do not yet point to prosperity of boom proportions. Having shaken off the sluggish feeling of the past few years, our economy is simply reaching out to regain some of its lost growth.

Business sights are aimed at growth rather than retrenchment. The coming months contrast pleasantly with last fall, when news was getting steadily worse. Now, month by month, news will be getting better. The building of inventories is emerging as a $1.5-billion (annual rate) positive force in the third quarter. It was a negative $4.5-billion in the first quarter of the year. Goods are moving out to the showrooms.

Customers have money—will spend. Employment and GNP are reaching record levels. Consumer spending is expected to rise to $338.5-billion in the next quarter. This figure is up $10-billion since the January-to-March quarter. The factory work week has returned to a healthy, hard-working 40 hours, after dropping down to 38.3 hours last December.

Many areas of output look healthy. Steel is rising to a point 20% higher than at the start of the year. Detroit aims to tickle the fancy of car buyers with many new models. If these catch on, auto production will rise steadily month by month to the year end. Private housing starts will probably be up to 1.45 million in a few months. In addition, builders are erecting more apartments to satisfy the new trend in demand. If urban renewal continues to catch on, apartments will be an improving market. Soft goods, little depressed in the recession, remain strong.

In short, 1961 will not look bad on the record. Capital spending has recovered and is moving ahead. Industrial production will equal 1960, and is set for a 10% growth in 1962. GNP, up a cautious $12.5-billion this year, may be up $37-billion next year.

So far, inflation is not a threat. The government has not had to tighten credit and fiscal reins as in the recovery periods after the 1954 and 1958 recessions. Plentiful credit at reasonable rates has encouraged business recovery. Federal emphasis is on stimulating growth. And the moderate Treasury deficit will permit further strides.

But this favorable picture could change. Fast-rising optimism and profits might lead to demands for inflationary wage boosts. If this should happen, anti-inflationary counter-measures could stall growth. Seasonal and cyclical pressures are already starting to boost prices. But so far they're not high enough to threaten inflation. **And lurking on the horizon: the rumble of war clouds.** A worsening of international tensions could soon change our guns-and-butter policy to one of guns-instead-of-butter.

WASHINGTON WIRE

A FACTORY PRESS TIME REPORT

PINPOINTING YOUR STAKE IN WASHINGTON THROUGH INSIDE REPORTS ON AFFAIRS VITAL TO PLANT MANAGEMENT.

An 8% tax credit on purchase of machinery and equipment has won tentative approval of the House Ways and Means Committee. But investment in new or expanded plants is excluded. If the plan becomes law (still doubtful), a company would be permitted to deduct from its tax bill 8% of the money it spent that year on new or second-hand equipment—up to 50% of its tax liability. The limit on used equipment purchases would be $50,000.

The situation is this: Committee technicians are working out formal language for a bill and trying to determine how much of a loss will be suffered by the Treasury. The tax credit will cost some $1.1-billion. Tax-tightening provisions (dividend and interest withholding, smaller expense account deductions, etc.) will fall short of making this up. If the loss is more than $500-million, President Kennedy would veto the bill. The committee hopes to have all details worked out by mid-month. Then it will proceed with a bill. Or junk the whole matter until next year.

Despite scare headlines, industrial mobilization controls are not needed. That is the best judgment of government experts who have studied the need for Korean-type priority and allocation regulations. Says one official: "The economy has a long way to go before we are in such a stringent situation that supply controls are needed to meet military requirements."

► **Changes in defense procurement because of the Berlin crisis will be slow in coming.** Total cost of the new measures contemplated will run to between $2- and $3-billion. Kennedy has already tacked $2-billion onto the Eisenhower defense budget of $41.8-billion for fiscal 1962. But only part of this would be for short-term procurement. The bulk would be for tactical arms and equipment buying over the longer haul.

Kennedy is reflecting much of the thinking of his personal military adviser, Gen. Maxwell Taylor. The retired Army chief of staff feels Berlin should be handled as another episode in the cold war rather than as a unique crisis. He wants a massive step-up in long-term procurement of conventional arms and equipment. The cost: about $3-billion extra a year. Taylor has long felt that limited war is a greater threat than all-out nuclear conflict. Others argue with this view. But Kennedy is leaning toward the Taylor line of thinking.

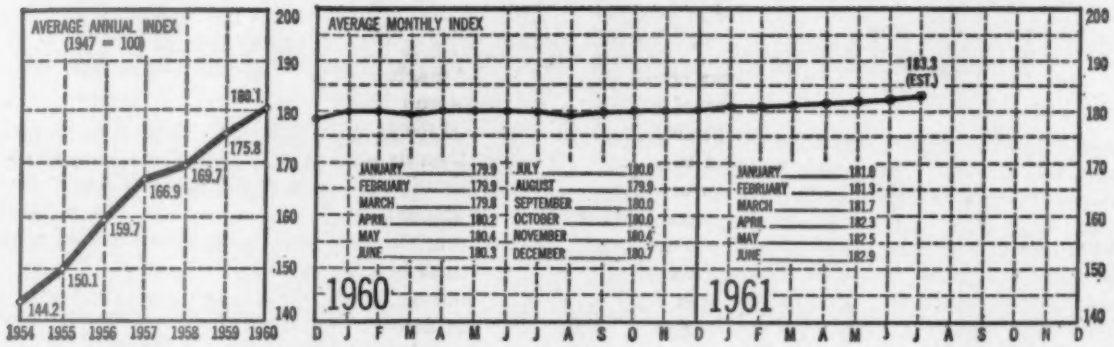
Plagued by haggling over traditional differences of opinion, the President's Labor-Management Committee has finally abandoned attempts to issue consensus statements. The decision was reached when members came up with too many different ideas on wage and price policy. So Chairman Arthur Goldberg set up five subcommittees to study and report on major problems. They'll report back to the full committee at its next meeting, Sept. 11. The reports will include dissenting minority views. The five broad subjects are: collective bargaining and industrial peace; economic growth and unemployment; automation, productivity, and living standards; competition in world markets; wage and price policies.

An attempt to change patent provisions of the National Aeronautics and Space Administration is bogged down in controversy. Under current NASA regulations, the government takes title to virtually all inventions resulting from NASA contracts. This differs from Defense Department procedures. There contractors may retain title to their inventions while granting a royalty-free production license to the government. The Atomic Energy Commission retains all patents to nuclear developments under its contracts.

Rep. Overton Brooks (D.-La.) wants to give the space agency the option of taking title to inventions or not, as it sees fit. There is, however, considerable opposition to his bill. A majority of other congressmen seem to prefer a sweeping new patent law to give the government title to all inventions resulting from federal contracts. The fight on this would not come before next year.

COST INDEX OF PLANT MAINTENANCE

A FACTORY PRESS TIME REPORT



Labor costs push totals up again

	AVERAGE 1960	JUNE (Preliminary)	MAY (Revised)
Building and Facilities Index	170.6	174.4	174.1
Materials	140.1	138.7	138.8
Brick	154.9	155.2	155.2
Elec. fixtures	131.9	130.9	130.9
Elec. switches, boards, fuses	183.3	182.0	182.5
Elec. wire, copper	147.0	142.4	138.9
Glass	148.1	147.7	147.7
Gutters, spouts, ducts	180.3	180.4	180.4
Gypsum products	140.9	142.4	142.7
Heating equipment	125.5	121.1	121.1
Lumber	128.7	123.8	123.4
Millwork	156.7	153.5	154.1
Paint	130.2	134.3	134.0
Pipe, cast iron	170.4	170.4	170.4
Pipe, steel	190.7	188.7	188.7
Pipe & tubing, copper	151.5	116.9	113.3
Roofing	113.9	120.0	121.3
Sanitary fixtures	162.4	161.8	161.8
Sash, metal frame trim	137.4	137.7	136.9
Solder	122.5	133.6	131.1
Steel, structural	236.3	236.3	236.3
Tanks, steel	139.6	136.7	138.4
Valves & fittings	167.8	163.7	163.7
Wire mesh	163.8	159.2	162.9
Labor	191.0	198.2	197.7
Carpenters	177.3	184.1	183.2
Electricians	199.4	206.8	206.3
Painters	196.2	203.6	203.6
Equipment Index	184.2	186.5	186.1
Materials	177.6	178.2	178.2
Abrasives	157.9	157.3	157.3
Alloys, non-ferrous	123.2	133.0	130.0
Bars & plate, steel	227.2	227.2	227.2
Bearings	160.0	155.4	155.4
Belting	160.9	166.9	166.5
Bolts, nuts & screws	225.2	236.2	236.4
Chain	187.4	193.8	193.8
Controls (electrical)	183.3	182.0	182.5
Gear-reduction units	181.1	174.5	174.5
Hand tools, mechanics	204.5	208.3	207.7
Lubricants	125.7	125.7	125.7
Motors	145.0	137.9	143.2
Non-ferrous metals	135.8	129.2	126.8
Precision tools	158.2	163.5	162.3
Pumps	235.4	197.0	197.3
Tools, cutting	186.8	183.1	184.1
Valves & fittings	167.8	163.7	163.7
Labor	188.7	192.0	191.3
All mfg. labor	185.1	188.4	187.6
Machine tool labor	192.1	195.6	194.9
FACTORY'S COST INDEX	**180.1**	**182.9**	**182.5**

Across-the-board hikes in labor costs led the march upward of FACTORY's Cost Index of Plant Maintenance to 182.9 in June. The 0.4 climb marked the sixth straight month of increase. Costs of materials, however, retreated slightly. The steady climb is disturbing. But it's interesting to note that the June reading of 182.9 was only 1.9 higher than the January level. If cost increases continue through December at this gentle rate, 1961 could be as mild a year as we have had since the recession year of 1958.

In the equipment component of the Index, general manufacturing labor costs were up 0.8. Machine tool labor stepped up 0.7. The building and facilities component of the Index fared slightly better. Painters' labor held at the same level, but costs of carpenters' labor and electricians' services were higher.

Materials prices were active in both major segments of the Index. In building and facilities, total materials costs were down 0.1; valves and fittings, 3.7; steel tanks, 1.7 points. This reflects the general weakness in prices of some types of steel that has become apparent recently. Electrical controls were also on the down side in June with an 0.5 drop. There were declines of less than a point for gypsum products and millwork. Price gains were recorded in electric wire, up 3.5; metal trim and sash, 2.5; and sanitary fixtures, 0.8.

Over-all materials prices in the equipment component of the Index were unchanged in June. Among individual items, nonferrous alloys registered a 3.0 gain; belting, 0.4; and precision tools, 1.2. Helping to keep the Index down were motors, off 5.3; cutting tools, 1.0; and pumps, 0.3.

No rise in labor costs is ever welcome to plant managers. But labor costs have turned up less sharply in this business upswing than has often occurred in the past. All current signs point to a continued gentle rise rather than a sudden surge.

LOOKING AHEAD IN LABOR
A FACTORY PRESS TIME REPORT

Taft-Hartley not enough, says JFK

Some time this month, the Kennedy administration will unveil *its* proposals for handling national emergency disputes. They are apt to contain some surprises—even for those who have known the administration's thinking in this area. Both President Kennedy and Labor Secretary Goldberg are disenchanted with Taft-Hartley. They feel the 80-day strike-stopping injunction in critical disputes is too inflexible to assist in bringing about a settlement.

The White House intends to ask Congress for an "arsenal of weapons" that could be used against labor or management—or both—in case a dispute of national emergency proportions gets out of hand. Kennedy's labor experts believe that under current rules both sides simply wait out the 80-day "cooling-off" period without actually being pressured into further bargaining. The White House wants the authority to take whatever action may be necessary to promote such bargaining. Their method will be to keep the parties guessing.

Among the proposals to be offered are these: (1) Quick federal mediation before contract talks reach a stalemate; (2) authority for the President to summon participants to the White House and demand a settlement; (3) Presidential seizure of an industry with the right to order retroactive pay adjustments once a settlement is reached; (4) a White-House-ordered "cooling-off period" without going through a court; (5) appointment of fact-finding boards with or without the right to recommend settlement terms—depending on the particular dispute.

Mr. Kennedy and his advisers feel that maximum pressure must be put on the parties to reach their own settlements. They indicate that industry must be kept worried about what Washington might do—and which side might feel the brunt of the federal power. This action would, they say, apply public pressure on the participants. It would also enable parties to "buy time" to keep talking instead of battling across picket lines.

Inter-union rivalry has heightened the problem of dealing with national emergency disputes. The recent maritime and airline strikes are cases in point. In the maritime case, it's the feuding Seafarers' International Union and the National Maritime Union. In the air, it's the battling flight engineers and airline pilots. At this stage, the administration's labor strategists are still undecided on whether further recommendations are necessary to handle this problem. Without labor feuding, the White House believes both disputes could have been amicably settled before they reached emergency proportions.

What Congress will do with Mr. Kennedy's proposals depends, in part, on the outcome of current auto negotiations in Detroit. Mr. Goldberg has said: "We cannot have a shutdown in the auto industry this year." A walkout by Walter Reuther's United Auto Workers could force quick Congressional action. So could a resumption of the maritime or flight engineers' strikes—both halted, at least temporarily, by White House action. But if none of these disputes reaches the strike stage, Congress is unlikely to re-open Taft-Hartley for amendment at this session.

•

The government's anti-discrimination rules for work on government contracts are official. And they're tough. They apply to federal contracting agencies, firms dealing with the government and labor unions whose members work on these contracts. All federal contractors must sign.

The federal agencies—Defense, Air Force, etc.—will do the actual policing of the contracts. All contractors and first-tier subcontractors must file reports with the government stating they are in compliance with the law. Each government bidder or proposed contractor must, if the President's committee demands it, also state in writing that the labor union involved does not discriminate in its membership.

Contractors complying with the anti-discrimination rules may be awarded, in public, a certificate of merit from the government. Those who fail to comply could face cancellation of their federal contracts. A non-complying union can be called into public hearing. However, the government has no legal authority to take action against the union.

The President's committee will seek compliance by contractors through voluntary means—mediation and persuasion. It will not publish complaints of discrimination made against contractors. It does not intend to disclose investigations being made.

SEE LABOR RELATIONS NEWS, PAGE 178

POWELL PERFORMANCE PAYS OFF

Any way you look at it, Powell performance really pays off. Take "availability" for instance.

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to prevent damage and downtime later

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Are you crying or buying?

Crying about depreciation allowances, we mean. As opposed to *buying* modern machines regardless of reserves the tax laws permit. Our point of view is that too many plants are, unwisely, deferring purchase of cost-saving tools. They are waiting for relief from what appears to be unsound depreciation restrictions.

Every company, or nearly every company, plays the competitive game by the same set of government rules. The successful companies continue to find money for modernization in spite of restrictive legislation. The unsuccessful companies are using the depreciation laws as an excuse for weak management. And many of these "crybaby" companies will eventually falter and fail.

It is economic suicide for management at any level to permit dissatisfaction with current depreciation rates to choke off its will to acquire competitive equipment. Granted there is a need for enlightened depreciation legislation. Agreed that in many cases current allowances penalize firms in highly capitalized industries. These laws also penalize workers because they hinder their employers from acquiring modern tools. And, of course, they penalize America's economic growth by discouraging increased capital investment.

But manufacturing management cannot afford the luxury of excusing inaction based upon seemingly unjust legislation. Sustaining its capital investments is the challenge every aggressive, imaginative, and dissatisfied management must meet. That's always been the road to business success.

Plant-side, there are two ways to cut manufacturing costs. You can cut them by (1) smarter management of existing facilities; (2) acquisition of more efficient facilities. In today's changing technology, few plants can afford to stand pat with yesterday's tools. What a plant needs is the kind of management that demands —and gets—capital investment ideas with a high rate of payback.

We think there's hardly a worthwhile company that cannot find money for equipment purchases with a two-year payback. The problem is usually the other way around: to discover these first-rate investment opportunities. And yet opportunities do abound for smart plant management. For instance, one of the nation's largest and most successful companies averages a 61% return on major equipment investments and 45% on minor ones. And this record is by no means unusual.

Of course, FACTORY would like to see improvements in the depreciation laws. Most business people would. But we think that for most plants the solution to profit problems must come from a renewed vigor in seeking out modernization projects.

L. R. Bittel

EDITOR-IN-CHIEF

Is chronic unemployment the first sign of a fatally sick economy? Some say yes. But Secretary of Commerce Luther B. Hodges disagrees. His view, given in this exclusive message to FACTORY readers: A restless, daring business initiative can override the barrier of chronic unemployment and prove . . .

today's prophets of doom are wrong

I am concerned about some aspects of the current economic scene in America But I do not despair of America's future. I remember well the Great Depression when it was being suggested that American free enterprise had reached its zenith and that henceforth the story would be that of stagnation and deterioration. The prophets of doom then were wrong. Today's prophets of doom are similarly wrong.

I have every confidence that our distinctive system of free enterprise—backstopped by responsible government policies—will reach new heights of achievement that will dwarf its past accomplishments.

For those who need a reminder of the gigantic progress America has made in the past, I cite just a few items:

- Today, in America, which possesses only one-sixteenth of the world's population and one-fourteenth of the world's land area, we produce and consume more than one-third of the world's goods and services.
- American consumers, representing one out of 16 consumers throughout the world, own and use two out of every three automobiles, one out of two telephones, two out of three TV sets, and account for three out of five scheduled air flights.
- In the past century, we have replaced the 72-hour, 6-day week with a 40-hour, 5-day week. And at present seven times as many workers, working half as long, produce twenty-five times as much in physical terms as we did 100 years ago.

I point out these past accomplishments not beause I think we can lean back with smug complacency and assure ourselves that things will be just as rosy in the future. Rather, I point to this proud record to demonstrate what is possible under the American economic system when there is a challenge and a drive. What has made this country great is a restless, daring business initiative in a competitive struggle for leadership. We have opened up one new frontier after another—once primarily geographical, more recently industrial and scientific. A generation ago, who would have predicted that millions of TV sets, automatic washing machines, and electric shavers would be produced under our vigorous free enterprise system and purchased each year by American families.

Our economic system today is in temporary difficulty because we are not taking full advantage of the opportunities for further expansion and further satisfaction of people's needs. There are again new frontiers to be crossed.

I think it is a tragedy that only 12,000 American firms out of 300,000 participate actively in our export program. The world needs and wants American products.

"I appreciate the opportunity FACTORY is affording me to state my views on some of the challenges facing the American economy. The public interest is well served by the bold and frank discussion of public issues that FACTORY has encouraged."

There is not, in my judgment, enough research and development work in American industry generally to create new markets in our own country as well as abroad.

We must identify and cross these new frontiers if we are going to solve the greatest single economic problem today—high levels of unemployment. I am disturbed over the possibility that even after we are fully recovered from the business recession that started last fall, we may find ourselves with unemployment of 5 or 6% of the labor force. After the 1954 and 1958 recessions, we ended up each time with higher levels of unemployment at full recovery. This should not happen in 1961.

American workers are understandably concerned about this possibility. The American government is properly concerned. And the American business community must be deeply concerned.

This is not a narrow, partisan issue. It was a source of great satisfaction to me when the President's Advisory Committee on Labor-Management Policy, meeting in the White House on May 1 of this year, unanimously approved a statement that decried the current unemployment level as "intolerable." Here was a Committee consisting of two Cabinet members—the Secretary of Labor and the Secretary of Commerce—seven top union leaders, seven national business leaders, and five prominent public figures. They had been assembled by the President for the purpose of making recommendations to him in the difficult area of labor management relations, wage and price policy, and related matters.

Perhaps even more important than their unanimity on the need to develop programs to reduce unemployment was their unanimity on a related question. They agreed that "technological change and automation must be recognized as essential to increasing the growth rate of the economy."

The fact that labor leaders like George Meany and Walter Reuther could endorse such a statement, along with industry leaders like Henry Ford II and Thomas Watson, was to me an eloquent sign that both labor and management will strive to develop constructive policies for economic growth.

"The problem posed by automation," the Committee's statement observed, "is how to achieve full technological efficiency without significant and lasting unemployment."

This, to me, is the key to our present and our future economic progress in America. Technological changes and modernization of our industrial plant—whether this be called automation or by some other term—do bring important problems of adjustment for workers, and for industry. We cannot ignore these problems. This is not the 18th

"I am opposed to any arbitrary pushing up o

or 19th century. The U.S. government, working along with imaginative management and labor, must in this modern 20th century play an active role in helping ease the adjustments in a period of change.

I am concerned, however, that preoccupation with the problems of adjustment might lead to resistance—subconscious, perhaps—to the changes themselves. It was therefore gratifying to find America's leading labor spokesmen take such an enlightened position. They welcome increased productivity. They know this is the key to a higher standard of living for their people. The only thing they fear is the immediate hardships resulting for those displaced.

This understandable fear must not be translated into resistance to modernizing our industrial plant. In the long run, such modernization will protect more jobs and create more new jobs than any protectionist devices that may be advanced today. I say this with the utmost consideration for, and understanding of, the fears that lead to protectionism. I will support every reasonable proposal for governmental and private action that will, on the one hand, ameliorate unemployment, and on the other, maximize re-employment opportunities for those displaced.

But America must modernize its plant. A recent McGraw-Hill survey indicates that just modernizing our present plant—let alone keeping up with coming advances—will require $95-billion. If we fail to do so, there will be two major consequences:

(1) Industrial productivity will fail to rise fast enough to provide for the kind of increase in real wages that the workers of this country have a right to expect.

(2) Unless our unit costs are reduced in the period ahead, it will become more difficult to meet the threat of foreign competition. The consequences will be a loss in American jobs due both to an increase in imports and a reduction in foreign buyers.

We must keep in mind, too, the fact that in the coming years our working population will have to support a larger number of people. There will be more young people in school and more retired people living to an older age. Each person working, therefore, will be required to produce more if we are going to retain and improve our average standard of living for the entire population.

Our concern is primarily for the individual who is displaced by automation. But we must be concerned, too, about the business or the industry that is displaced when a new technique or a new facility or a new source of energy is developed. Overnight, a business equity built up over many years can be destroyed. We are challenged to help such a business reorganize and re-tool and seek new outlets for its capacity.

The government's responsibility, it seems to me, is three-fold.

First, we cannot be—and this Administration is not—insensitive to the plight of people and businesses that are victims of industrial change. This explains our support, to cite just a few examples, of extended unemployment insurance, lowered retirement age, and depressed areas legislation.

Second, we must be concerned about the health of our industrial plant and the skills of our manpower.

And third, we must be concerned about our total economic program in order to encourage and make possible an increased rate of growth and, with it, full employment. Even with a sustained and high rate of economic growth, we will have some problems resulting from automation and other types of hard-core unemployment. But there can be no question that the problem will be a lot easier to solve if we do sustain a high rate of economic growth. Only then will

wages not reflected in growing productivity ”

there be the incentive to train and retrain workers, to use young people and old people, to use women who seek work, to use our minority groups.

Perhaps the most significant step ever taken by the federal governmnt in the area of structural unemployment is the new area redevelopment legislation. The Commerce Department is charged with over-all responsibility for the program, although some very key functions are lodged in the Labor Department and other agencies. It will be a valuable experiment, not only in terms of area development, but in evaluating the whole question of government ability to help both workers and industry meet the problem of industrial changes.

The President's Advisory Committee on Labor-Management Policy has been challenged to make recommendations on another difficult problem. Here again, I hope we can see the kind of statesmanship and public interest that are needed.

As we get out of the recession, we must do everything possible to avoid new inflationary pressures. Unless we do, the recovery will never be good enough or sustained long enough. More and more, other nations are beginning to compete successfully with America. Although we are far from being "priced out of the market," we are being challenged in a growing number of industries and products. We must keep our costs competitive. Since our wage levels are, and should be, substantially higher than those in other countries, our unit labor costs can be kept down only if our productivity continues to rise.

I believe in high wages for American workers. This is both economically justified by an expanding economy, and economically necessary to keep it expanding. But I am opposed to the arbitrary pushing up of wages that is not reflected in growing productivity of the economy. A wage-price spiral—regardless of who may be considered the culprit—is just not good for our economy and for our world position. And it is cruelly unfair to millions of our families whose income is relatively fixed.

I believe in high enough profits for American business to sustain growth and encourage investment. But I am opposed to artificial price fixing. And I am opposed to profit levels that lead to reduced demand and a resultant low level of production. If we are to provide full employment and a high real standard of living, we must seek to operate at high levels and at price levels that will yield moderate unit profits but high aggregate profits.

I believe these things about wages and prices. But I believe in our free economic system above all. I would therefore hesitate to urge direct wage and price controls, except in time of national emergencies. But if we are to avoid governmental wage and price fixing, we must hope for private actions that will keep the public interest in mind at every collective bargaining table and at every board of directors' meeting.

Summing up, I look to a bright future for the American economy if each part of America does its job properly.

Let business once again show the vigor and imagination that built this great economy of ours.

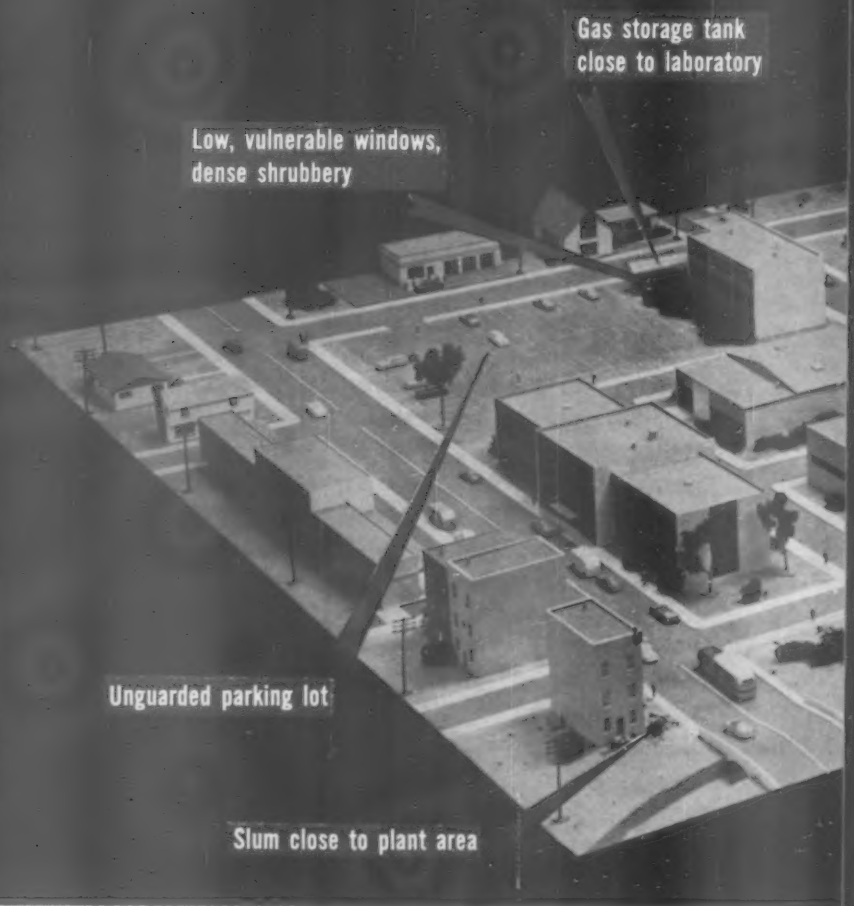
Let labor cooperate in the further modernization of our technology and pursue responsible wage policies.

Let people support programs to create a proper climate for business prosperity and to help workers and industry adjust to revotionary changes in the economy.

Above all, let us all work together for the common welfare. For, in the long run, there can be welfare for no group in the absence of the common welfare.

SPOT THE GAPS IN PLANT SECURITY

Last year, half a billion dollars was stolen from U.S. plants. Some of it—maybe a lot—was extracted from yours. Here's how to fight back.


Gas storage tank close to laboratory
Low, vulnerable windows, dense shrubbery
Unguarded parking lot
Slum close to plant area

Plant protection is one operating cost you can control pretty tightly. Unfortunately, it's easier to learn what protection costs than it is to find out the cost of ignoring it. And it's human nature to duck known costs and risk the unknown.

The possible losses go far beyond the matter of an employee taking home a few tools and a roll of friction tape in his lunch box—although this sort of thing probably costs a great deal more than you might imagine.

Set aside pilferage for a minute and think about the potential for real theft in your plant. Is the product itself desirable? Could there be collusion between the man selling your scrap and the man who buys it? Are you sure all the trash leaving the plant is innocent trash? Could a man pick a broken tool out of the scrap barrel and turn it in for a new one? Is the plant vulnerable to vandalism or burglary? Are you sure none of the "salesmen" that get into the plant is an industrial spy? Are the empty trucks and boxcars that leave the premises really empty?

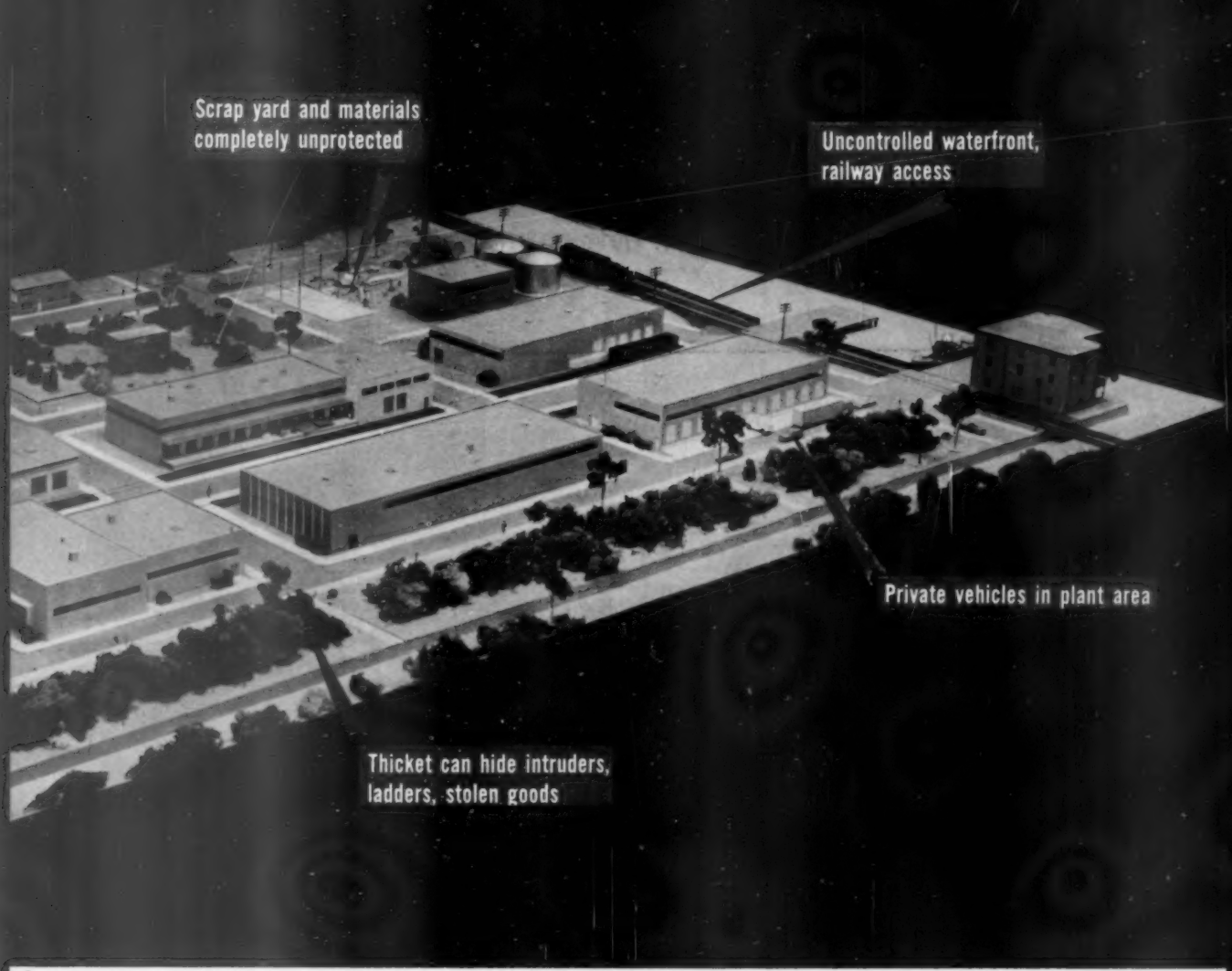
You can make a quick and fairly effective survey of your plant security by simply taking a walk around the place—once you know what to look for. For tips, FACTORY checked with the Pinkerton Detective Agency, which just set up a unique school of industry security at its New York headquarters. Climax of the week-long course is an analysis of the security problems of a typical factory. The plant is represented by the scale model shown above and on the following pages.

The model suffers from just about every hazard you can think of. Each "student" is given 8 hours to study it and suggest the most effective solutions within various budgets. (Clearly, in an attempt to get air-tight security, you could spend so much money that you'd protect yourself right out of business. Sometimes, just taking a calculated risk is the best way to handle certain security problems.)

In addition to the glaring hazards marked on the photo above, the model shows a long list of other problems. A sampling:

- The unprotected transformers constitute an "attractive nuisance" to children in the neighborhood.
- There is no auxiliary water supply.
- The warehouse is isolated, highly vulnerable.
- There are no guards to control traffic to and from company property. No personnel identification.
- There is no perimeter fencing or lighting.
- Receiving and shipping docks are not controlled; truckers and other outsiders have access to the plants.

It's relatively cheap to get at least some control over


Scrap yard and materials completely unprotected
Uncontrolled waterfront, railway access
Private vehicles in plant area
Thicket can hide intruders, ladders, stolen goods

"inside" theft. Besides locked tool and stock cribs, tight key control, inventory checks, etc., you can do a lot with a direct appeal to employees. Tell them what theft costs, what precautions you take. Ask them to report all losses at once. Enforce strictly, so they'll know you mean business, and can rely on getting fired on the spot if they're caught. If tools are being stolen, maybe you should freely loan them to employees. Screen new hires—especially guards—carefully. A "friendly" guard is far worse than none at all. Word gets around fast, and he soon becomes a funnel.

Protection from "outside" theft costs more—but there's usually more at stake. Actually, a burglar can calculate his chances of success much better than a hold-up man. So there are far more burglars. Alarms, locked doors and windows, and so on, are pretty futile without a guard system. The thief just enters the plant and hides until everyone goes home. Then he does his dirty work and breaks *out*. So all the alarm does is assure you that you've been had.

Guards, in turn, can't be very effective unless you have at least perimeter fencing—they can't be everywhere at once. A good fence around the property is your first line of defense. But don't rely on it too heavily. It may keep out amateurs, but experts say a determined man can penetrate *any* fence if he's given enough time (so don't give it to him). A fence has three purposes: (1) It defines the perimeter of the property in no uncertain terms. This puts the onus on the intruder—he can't say he got on your premises by accident. (2) It acts as a barrier—a very effective one, if it's built right. (3) Most important, it forces the intruder to expose himself while crossing it.

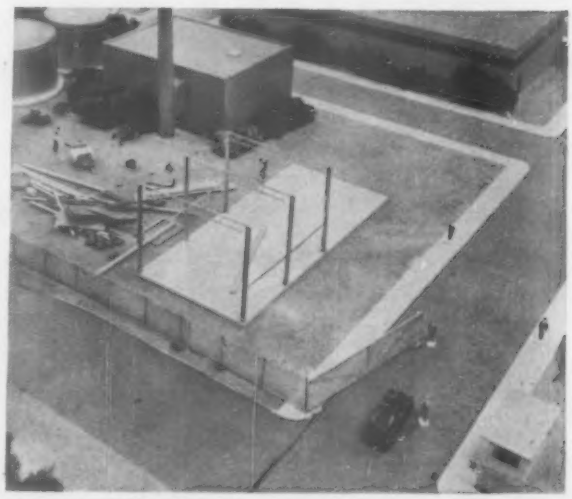
To make exposure more certain, specialists say the fence should be at least 8 feet high with barbed wire at the top and bottom. It should be made of 9-gauge chain link, held rigid by a post every 10 feet. If at all possible, the ground should be clear for at least 20 feet on each side of the fence. There should be no thick bushes next to it, in which a thief could hide a ladder. And no trees or telephone poles close enough to help a man cross the fence. Another common trick is to drive a car up next to the fence and use it for a platform. In loose, sandy soil, the fence should reach down into the ground far enough to discourage digging under it. Be sure the guards check the fence regularly, and don't get lax about inactive gates.

For more things to check on your security survey, turn the page. Then, if you want professional advice, contact an insurance company or a major detective agency.

After the plant is fenced and guarded, a thief can still spot big gaps. Here are some he'd notice.

PLANT PROTECTION CHECKLIST.

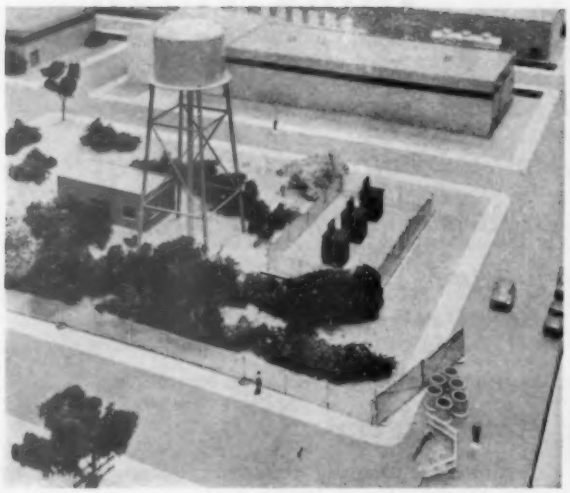
- ☐ Perimeter fencing and clearance. Could a man dig under?
- ☐ Gates and guardhouses. Inactive gates kept locked?
- ☐ All tunnels, pipes, sewers with man-sized openings.
- ☐ Control of shipping and receiving docks.
- ☐ Efficiency and supervision of guards. Phone handy?
- ☐ Streams or other bodies of water. Not reliable barriers.
- ☐ Entry and exit control of employees and visitors.
- ☐ Perimeter and area lighting. Can it be tampered with?
- ☐ Security of all doors and ground-accessible windows.
- ☐ Detection and alarm systems. Can they be defeated?
- ☐ Exit checks on trucks and rail cars leaving premises.
- ☐ Local police and fire protection. What's the time lag?
- ☐ Any "attractive nuisances" on company property.
- ☐ Potential fire and explosion hazards. Hedge all bets.
- ☐ Control of traffic in waste, scrap, trash, and refuse.
- ☐ Tool and stock cribs, attractive finished goods.
- ☐ Housekeeping, yard maintenance. Kill tall weeds, grass.
- ☐ Repair and building projects. Watch contractor's men, too.
- ☐ Auxiliary water and power supply. Are they reliable?
- ☐ Vehicle control and inspection. Even the big shots.
- ☐ Remote or inactive areas. Stolen goods stashed there?
- ☐ Controls built into the finance and accounting systems.
- ☐ Protection of employee property (company may be liable).
- ☐ Obscure hazards—loaded trucks left overnight, etc.
- ☐ Warehouses and storage areas, isolated buildings.



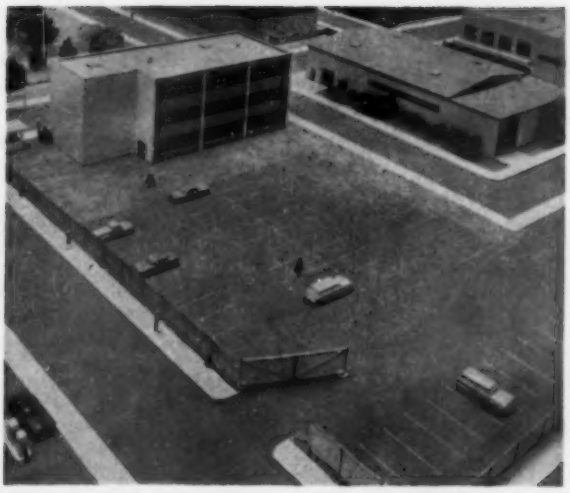
PERIMETER FENCING helps control losses from the materials yard. Scrap leaving the premises can be checked at gate. But haphazard material may hide stolen goods, or be planted and used later to cross the fence. And oil tanks next to the powerhouse should be well banked with earth.

PARKING LOT is secure from outsiders, but it should be completely fenced to protect plant area. Unsecured office building is handsome, but defeats everything else—any unprotected window less than 18 feet off the ground is an entrance. One answer: an air-tight burglar alarm system.

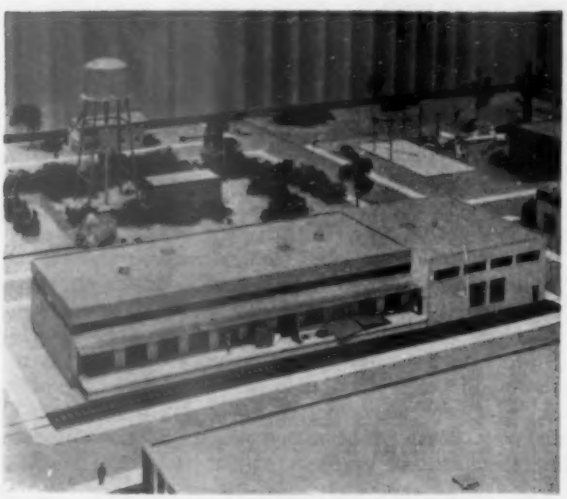
STRONG COMBINATION of fencing, gate, and guardhouse offers good protection and traffic control. Thicket has been removed from banks of the canal. But water is not an effective barrier. The canal—and all river and lake frontage—should be fully fenced and patrolled for reliable security.



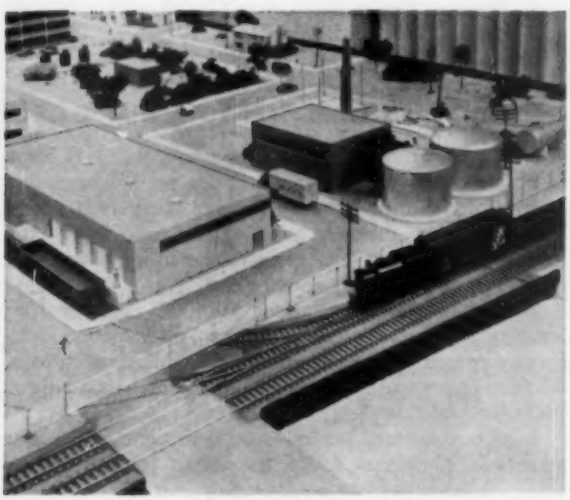
TRANSFORMERS have been fenced, and an auxiliary water supply added. But the shrubbery next to the main fence can hide people, ladders, or stolen goods. Gate can't be closed, guard can be distracted. That storm sewer is an open door to a thief. Bar any opening over 84 square inches.



CONCEALING SHRUBS have been removed from base of the laboratory, and a perimeter fence put up. But lab visitors can easily walk off with company secrets, low windows behind lab are out of guard's sight, and parking lot is still not controlled. Open gate is convenient but worse than none.



OUTSIDE STORAGE on loading dock is poor practice. It's much harder to steal large items once they're inside. Dock should also be guarded from rail and truck employees.



CHAIN-LINK FENCE here is deceptive. Man could climb telephone pole next to it, and hop over. Guard should watch rail spur activity, check in and under all cars leaving.

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To succeed with AUTOMATIC CONTROL— think small

Thinking big can be the wrong way to start if you're trying to cut costs with automatic controls. The best way for the average plant to save money is still through wider use of modern single-function, off-the-shelf controls.

BY A. J. DOLAN, Engineering Manager, Westinghouse Electric Corporation, Newark, N. J.

Stalling on needed control improvements while waiting for completely automated machinery can be a costly mistake. One-step-at-a-time improvements using modest-priced controls may pay off faster in the end.

A $30,000 machine tool that promises a 2-year payoff looks good. But $5000 spent on ten $500 productivity improvements with 4-month payoffs will bring the same net return. And small, fast payoffs on automatic control investments have other advantages:

1. Because they're small, you can get appropriations with less red tape and delay.
2. Small, time-saving changes are less resented by employees than large, job-threatening ones.
3. Engineering and delivery time are short; the lag between concept and usage is minimum.
4. Unforeseen changes in product demand or methods are far less likely to occur before payoff.
5. Finding man-hours is less of a problem. Tying engineers up on long jobs is never easy.
6. You'll develop your own control experts. Then, when you're ready for complex systems, you'll have the men available to design them.

Start by modernizing your obsolete controls

A whole new array of improved components has become available in the last few years. If you are still repairing controls built during the 1940s and early 1950s, you may be throwing money away. Here are a few of the advances of the last few years—some so important that it pays to discard older components.

Relays used to last about 100,000 cycles before wearing parts needed replacement. Today for the same money you can buy units good for a million operations. They're easier to service, need less maintenance adjustment, and take 40% less panel space.

New pushbuttons are oil- and dust-tight, and easier to wire in. They pack double the control functions in the same panel space. Or you can get built-in pilot or warning lights—all in less space than the obsolete single-purpose pushbuttons.

Pilot-light failures are cut. New designs use rugged low-voltage bulbs supplied from miniature transformers. A push-to-test feature enables an operator to check dependability of every pilot on a panel by running his thumb across each lens.

Modernizing can be done as each old panel is reviewed, or a step at a time as parts need replacing. Most of the improvements noted here are in the $2 to $20 class. It doesn't take many minutes of downtime or maintenance time saved to get that back.

Look for easy ways to prevent expensive troubles

How many of your machines keep the operator chained to one function because no one bothered to mount limit switches? How many of your men must watch bins, tanks, or hoppers for fear of over-filling—because high-level shutoff switches are missing? On adjustable speed drives, does someone have to keep a hand on the speed control because a simple overspeed switch is missing? Do you have overhead cranes that could damage expensive equipment if the operator has a momentary lapse of attention? Limit switches could cure that, too.

What about places where excessive off-normal pressure can cause harm? Pressure switches are cheap, dependable, can be installed quickly in any fluid line. Do your workers have to worry over non-movement (on

vibrating shake-outs or conveyors, for instance)? Zero-speed switches will flag any pre-set stall speed.

Do you have men waiting for drives to slow down before they can press the "reverse" button? Anti-plugging relays do the job automatically, without mistakes.

Few of these improvements cost more than one or two hundred dollars installed, for drives up to 5 or 10 horsepower. Many cost less.

Outwit equipment that demands constant attention

How frequently must your workers watch a clock before turning a valve, changing a temperature setting, or throwing a switch? Why couldn't those jobs be done better with a timer? Modern timing relays can be manually pre-set, then changed during the cycle for any time duration, if conditions change. Or they can be completely automatic. As their cycle ends, they can start up another timer controlling the next step in the process.

Have you studied your yard lighting, night/day area or oven-temperature settings, valve positions, ventilating fans, and the like, for possible switching to clock control? More plant operations than you realize may be time-predictable, with the operators making mental decisions that their particular processes will be finished in so many minutes. Where this is the case, why not have them dial in their estimate on timers, and be free for other duties?

Timers generally cost from $25 to $100, will handle up to about a ½-hp. motor directly. Add another $10 to $50 for a relay to control larger motors.

Do your operators have to guess whether drive motors are overloaded? An ammeter ($25 to $400) in the motor circuit ends burnout fears.

While you're looking, don't skip over the opportunities to use over- or under-temperature, pressure, flow, or level relays with warning lights or horns. Or to put in pilot lights that tell an operator what stages in complex processes have been completed. Getting rid of confusion reduces the chance for error, often enables an operator to handle more work.

Let workers use hands for skills, not switching

Some industries (coil winding, garment, canvas products, for instance) take foot or knee switches or speed controls for granted. But some plants never seem to think of them. They force operators to reach for a push-button or turn a knob just at the time manual skill is needed most. New foot switches will take years of abuse. The cost: $25 to $75.

Do your men have to slow down when they are carrying small loads so they can turn a handle to open a door? Automatic doors with a pressure switch on the floor are the answer. Same thing applies for truck operators. Door-opening (and closing) switches mounted overhead with a pull rope within easy reach of drivers can save several man-hours a month at busy points.

Eliminate non-productive walking and climbing

In some plants, operators spend much of their time walking all over to read meters, climbing stairs to check gauges, hurrying to another point to open a valve . . . How much of this could be handled better from a convenient central point? Today, conversion operators are easy to mount on any valve, rheostat, or shaft. Remote temperature, flow, gauges, electrical meters are accurate, yet inexpensive, and usually take only a few hours to install. Remote tank and bin level indicators end frequent trips out in the yard to check on things.

Besides saving shoe leather and time, centralized control will upgrade operators' effectiveness. When all information is at one point, off-normal operation can be spotted faster, and corrected or compensated for.

Make maximum productivity easy in your plant

Machine tools aren't the only place where adjustable speed drives will give you fast payoff. Other equipment may show substantial output increases if the operator can tailor drive speed as needed for conveyor belts, mixers, reduction mills, or other process machinery.

How many of your operations could be speeded if dynamic braking or plug-reversing controls brought machinery to a stop rapidly? Automatic speed changing in a cycling operation can double the speed during a return stroke or light-load portion of the cycle.

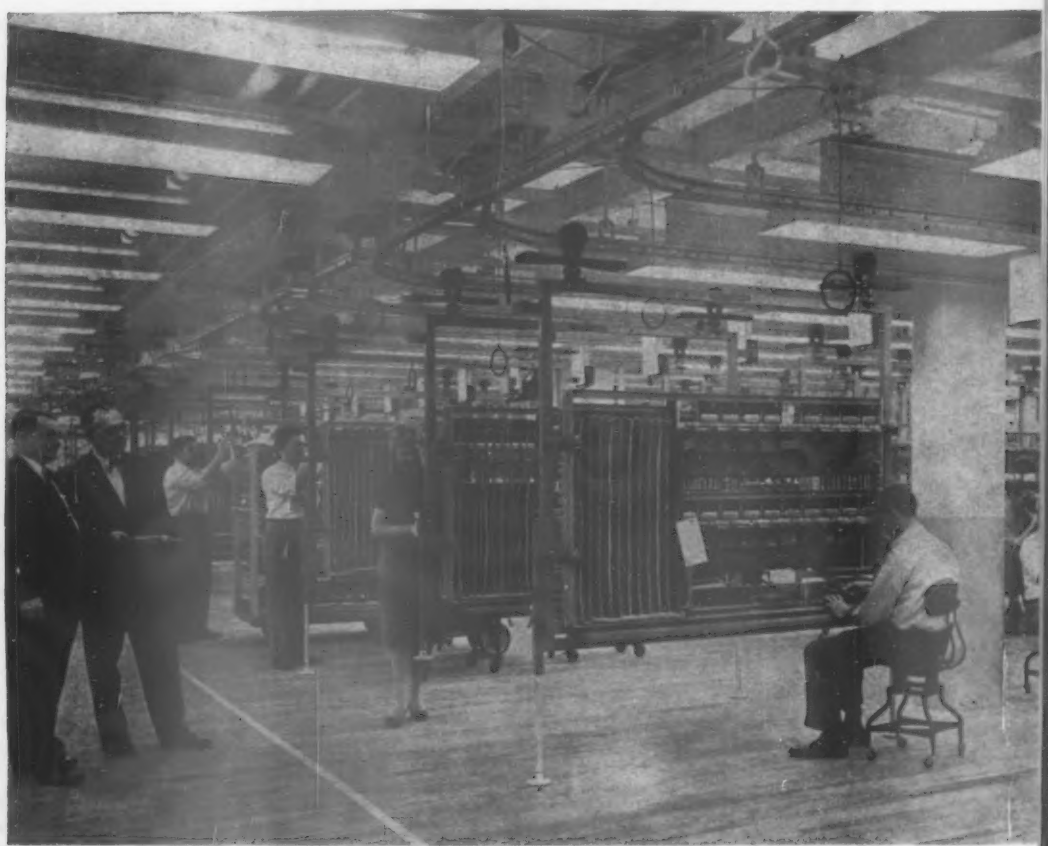
Motor load indicators now take no more panel space than an ammeter. They tell the operator and his supervisor at all times how hard a machine is working. For about $125 you can install one on any motor.

Counting, like decision-making, demands concentration that takes time. For $100 and up, you can buy electric or electronic counters to match any conceivable product or rate of production. So there's no need to guess at batch sizes or proper filling operations.

Remember that decision-making even slows down maintenance. How much faster could your trouble shooters work if they knew you had installed locks or automatic shutoff switches to protect them from high-voltage hazards when they opened a control panel door?

You don't have to worry that numerous controls will make your plant look like a Rube Goldberg layout—or make it hard to maintain. Not if you follow sound wiring practices and use the rugged control equipment now available. Because of new designs, new materials, new techniques, today's industrial controls are built to withstand the vibration, dust, and heat that would have ruined older components.

Bold engineering is providing . . . NEW LIFE



LOOKING YOUNG as the newest glamour plant, this recently modernized production area has near-ideal working conditions, the ultimate in product handling equipment. The massive program to update the old plant will continue until 1964.

Hawthorne is rebuilding. Western Electric's sprawling manufacturing city, the Hawthorne Works, in suburban Chicago, is a beehive of activity. It's getting new jobs, a new look, a new lease on life.

Biggest (4,600,000 square feet) and oldest (55 years) of Western Electric's plants, Hawthorne presented the ultimate of that familiar problem: what to do with an old plant. WE's decision: a multi-million-dollar reorganization and modernization program—a plan that has put a smooth-flowing, straight-line process into the half-century-old six-story buildings.

It has been a grueling, fantastically complex job—and it's not over. But the results already have everyone convinced that their decision was the right one.

Since World War II, the productive output of Hawthorne has surged continually upward. To meet the demands, especially during wartime, additional space was leased in the Chicago area. Over the years, nine different manufacturing areas (3½-million square feet) were leased. This meant 43% of the space under Hawthorne control was farmed out.

The space freed by these moves into rented quarters increased the capacity of jobs remaining in the plant. However, in many cases time or production schedules didn't permit the rearrangements necessary to consolidate similar work into the most effective operating units. For example, take the machining and finishing of a telephone exchange switch frame. Five operations

for an OLD WORKHORSE

SHOWING ITS AGE, the plant exterior is also due for a face lifting. While the iron gates were standard practice a half-century ago when the plant was built, they're out of step with current trends. Modern entrance will replace them.

(casting, milling, plating, drilling, and assembly) were done in five different buildings—and on three different levels (first, third, and fourth floors). Between each operation the frames were moved by trucks, skids, and elevators.

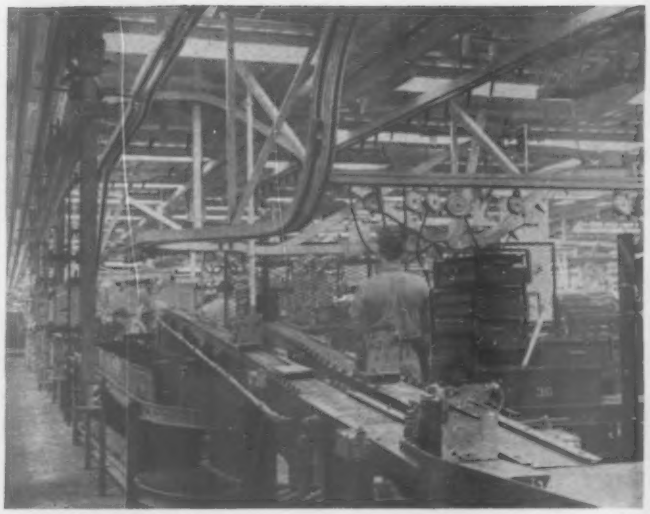
Nevertheless, production schedules were met—schedules often heavier than anticipated.

In the new arrangement, the first four production operations are now taking place on the same floor of the same building. Only for assembly is a product taken to another building.

Operating in many locations, and with sacrifices in orderly material and product flow was an expedient that got the job done. But by the fall of 1956, the long-range outlook was such that the company decided on a major expansion into owned space. Since then, three new plants have been built at Omaha, Oklahoma City, and Columbus, Ohio. (The latter was a FACTORY Top Ten winner in 1960.) These plants provide WE with an additional 4,100,000 square feet of space or about the equivalent of another Hawthorne.

As the new plants were finished, crossbar switches (for central telephone offices) and associated component manufacture were moved to them from Hawthorne and from the leased building. This paved the way for the extensive factory rearrangement program. In addition to consolidating farmed out operations, large areas of

Putting a straight-line process in a six-story building taxed everyone's engineering talents. But now that it's in, they're all proud.



LACING CONVEYORS through the immovable obstructions of old building was a demanding problem in layout, but WE engineers came up with a complex yet smooth-flowing solution.

existing shops are being reorganized to salvage numerous small chunks of space. When the consolidation is complete, about half of the total Hawthorne area will have been rearranged.

This work is being done in the face of rapidly increasing production schedules. At Hawthorne (as with most plants today) modernization had to be done without substantial downtime. Added to this, completion of the improvements had to match completion dates of the new plants and the expiration of the leases of the rented buildings.

All of which adds up to some brutal problems in coordination!

To resolve these problems, Hawthorne planners took the following eight steps:

1. Broad relocation plan

A schedule of rearrangement by years was prepared. It outlined products, the quarterly action necessary at Hawthorne to clear space, building changes, and subsequent re-occupancy.

2. Basic division of work

A study has been conducted to allocate the manufacture of the products remaining at Hawthorne between the Hawthorne main plant, its principal subdivision at 26th Street, and the Montgomery plant. The latter is an owned satellite location at Montgomery, Ill., about 35 miles away.

3. Hawthorne block plan

Conventional block plans were prepared, plus a three-dimensional block plan in a plastic model of the multi-story Telephone Apparatus (TA) buildings. These provided the foundation for the plans for the consolidation and rearrangement of Hawthorne. The usual two-dimensional template floor layouts were then made for each building.

4. Detailed schedule of moves

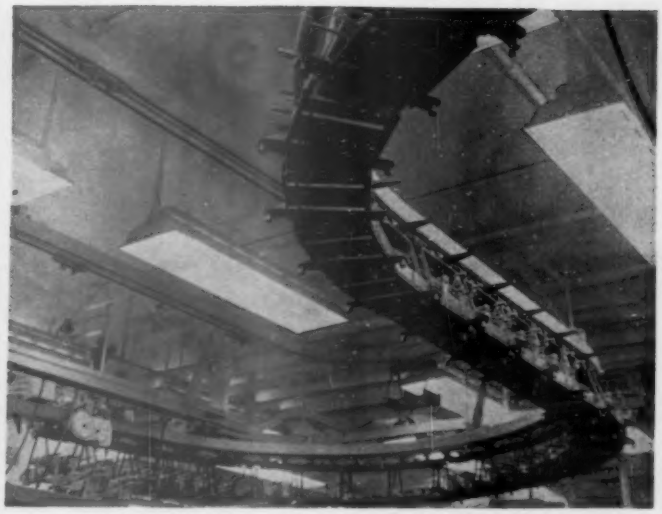
A summary of moves, with each move numbered, was prepared in advance. This scheduled the detailed action by quarters for approximately 300 moves, each identified by building and product, starting in 1958 and extending into 1964.

5. Estimated cost summary

The estimated cost of each relocation identified by move number was itemized to show the total anticipated yearly expenditures.

6. Top priority moves

A list of urgent jobs is issued periodically to establish priority ratings as a guide for affected organizations in setting up work schedules.



OVERHEAD LOOPS make effective staging areas for telephone switching components. They allow at-a-glance checking of supply, also help keep valuable units out of harm's way.

SOLID WALLS were cut through as conveyors linked one building with another. At this newly made opening, a worker sends an empty frame on its way to start collecting components.

7. Periodic schedule for building maintenance, preparation and reconditioning

In order to alert all organizations that were responsible for building reconditioning and service needs, a building schedule is issued periodically. To reduce expense, every effort is made to paint, install lights and services, and do other non-routine maintenance in an area at the time it's vacant of equipment.

8. Progress-review conferences

Regularly scheduled conferences are held with all interested organizations invited to discuss each job. The purpose of these meetings is to ferret out any bottlenecks that might affect the rearrangement program. Also, since conditions change and production schedules vary, it's essential that plans be flexible. Minutes of these conferences are published to show the current status for the various phases of the job from start to finish.

Over 3200 carloads of machines, degreasers, benches, plating facilities, etc., had to be disconnected, moved, and reinstalled to complete the transition.

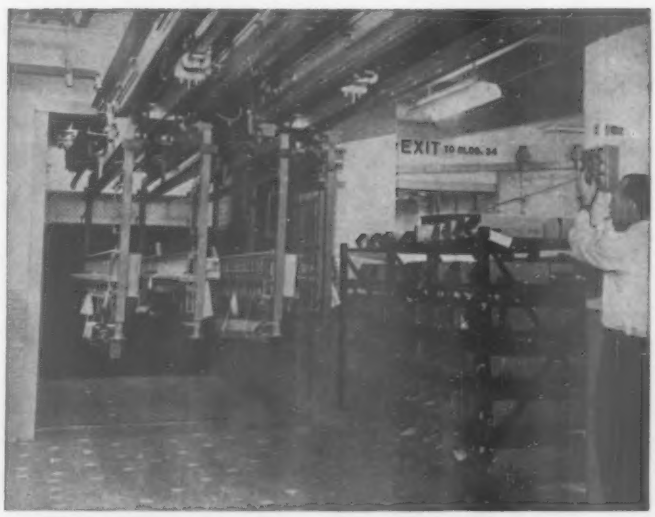
Coordinating the massive move was Joseph L. Evans, Hawthorne's Department Chief of Plant and Factory Engineering. He sums up the whole operation in this typical understatement:

"The work of planning, engineering, and physically moving approximately 15,750 square feet of gross (approximately 10,000 available) manufacturing facilities each week over a period of five years would be very difficult if moving into unoccupied space. But our job was to rearrange or relocate a large part of this area and at the same time maintain production. The current trend of an increased production program further complicates the problem."

WE believes that the manufacture of step-by-step (central telephone switching) equipment and its associated components will represent the bread-and-butter work at Hawthorne for some years ahead. Therefore, the decision was made to give it top priority in the assigning of space, compatible with multi-story operation and consideration of fixed installations such as an air-conditioned tool room; heat-treating furnaces; capacitors; and similar facilities. Consequently, the second and third floors of the center tier of the Telephone Apparatus (TA) buildings were selected for the final assembly and wiring operations. Adjacent floors and buildings house the piece part and partial assembly work that feeds toward the center.

The objective was to prepare a plan that would provide the most modern layout of facilities using a multi-story building. Further, the goal was to employ the best methods of manufacture that can be developed to fabricate products at a minimum of cost. To do this, items are being straight-lined to improve the sequence

Western Electric's planners saw a golden opportunity to do some long-needed modernization while the manufacturing process was being revamped.



A QUICK RIDE UPSTAIRS is no problem at all with this automatic elevator (one of several) equipped with three monorail segments. Operator (right) pushes button to load car.

of operations, reduce material handling, use personnel more effectively, cut process investment, minimize trucking activities, and get better elevator usage.

The physical size and arrangement of the Hawthorne multi-story TA buildings made it difficult to visualize the exact location of items to be manufactured. A Plexiglas model of the buildings was prepared for use in demonstrating the block plan. Colored layouts of other buildings are used to supplement the model.

This model becomes a three-dimensional plan when various colored templates, with geometrical designs to indicate the type of manufacture in each area, are added to each floor. With this method of presentation, the flow of material and sequence of operations can readily be followed from floor to floor.

The Plexiglas model was constructed on a 12-ft. to 1-in. scale for the floor areas, with an arbitrary 4-in. vertical spacing between floors for easy observation. It may be assembled on three special-design mobile cabinets as a complete unit, easily moved to conference rooms for discussions, or separated for observation of the inner areas. The cabinets have sliding shelves for each floor so that the model can be assembled one floor at a time.

This block-plan model will also be used as a progress chart as construction is started and completed by adding additional templates.

Material is received in a new first-floor receiving court and flows vertically to piece-part manufacture, next horizontally on the upper floors until completed, and then down to the shipping dock.

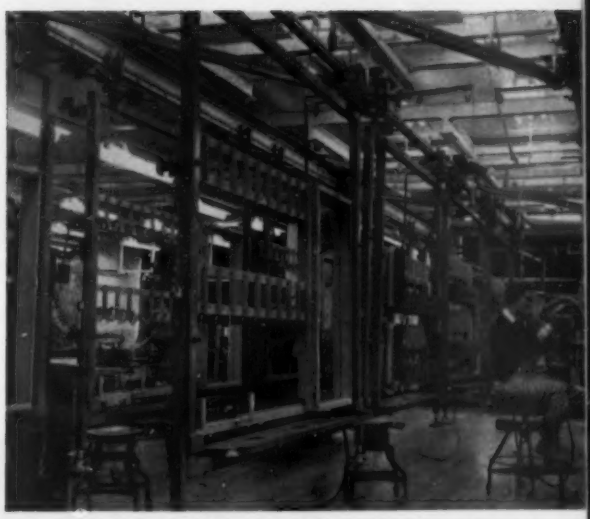
In general, raw material storage is adjacent to the receiving area. As far as possible, the numerous elevators at Hawthorne are used as special-purpose lifts. That is, one elevator may operate from the first to the second floor only, another might operate between the third and fifth floors. In most cases they are automatic, and passengers are not permitted.

Joe Evans voices his faith in the remodeled facility this way: "The current trend in designing factories for our type of manufacture is to one-story plants. But the existing multi-story plants will be in use for many more years. Their compactness is in their favor. And when properly utilized with straight-line flow of materials from receiving to shipping, the multi-story plant should be able to compete quite favorably with the modern one-story factory."

While the rearrangement and consolidation plans were being formulated, it became obvious that the golden opportunity was at hand for a most necessary modernization of Hawthorne.

A substantial part of Hawthorne is over a half century old. More than 75% of the buildings at Hawthorne were built prior to 1922.

PLENTY OF SPACE to work has been assured with new layout. Note the high lighting levels (furnished by both old and new fixtures), new floor coverings, topnotch housekeeping.



WIRING UP THE BOARDS calls for high-skill labor. Hawthorne expects plant improvements and excellent working conditions to help compete with new plants nearby for such labor.

But how do you go about selling a multi-million-dollar modernization plan for an old plant?

On the plus side: In spite of the expansion that is taking place at Omaha, Columbus, and Oklahoma City, Hawthorne continues to be the largest WE plant. In fact, it is the main plant of the company. To many people Hawthorne *is* the Western Electric Company. The floor space available is slightly in excess of 4,600,000 square feet. About 16,000 employees work at Hawthorne. To reproduce an equivalent facility elsewhere would come to more than the combined costs of the new plants at Omaha, Columbus, and Oklahoma City.

Besides, the old plant has a near-ideal location. It's at the outskirts of the city, near the Burlington Railroad, on several bus and rapid transit lines, and sits at the intersection of two major highways.

On the other hand, the residential areas to east and north are edging outward from the city. As this continues, these areas will no longer be a source for any but a very small proportion of acceptable employees. Hawthorne will need to draw personnel from continually widening areas. In doing so, it will be compelled to compete more and more with new modern plants. One of these nearby plants competes for exactly the same types of people and kinds of skills.

The first step in the modernization was to formulate a plan. In January 1959, a department was set up under Assistant Superintendent George Bates. Four engineers completed the team. Their assignment: to make a complete engineering study, and recommend the plant improvements necessary—and feasible—for Hawthorne. A start had already been made by the construction of a new receiving court, and by the modernization of the engineering offices. But it was felt that the way to complete the job in a minimum of time was to set up a separate engineering organization, divorced from all other responsibility.

In about seven months they had completed the study which recommended the following improvements:

- Modernization of all offices.
- Modernization of all rest rooms.
- New passenger and freight elevators.
- Three new entrance lobbies.
- Air conditioning of all offices, hospital, restaurants, cafeterias, and engineering laboratories.
- New hospital.
- New cafeterias.
- Yard improvements.
- Merchandise loading docks.
- Auditorium.
- Consolidated engineering laboratory.

A final recommendation was that single-occupancy offices be provided for all assistant superintendents then in double offices.

The study also covered the preparation of cost esti-

Employee services that compete with the billing in Western Electric's plans to

SPACIOUS LIBRARY has magazines, best sellers, references, self-help books, and a full-time librarian. And there's a program to help readers buy new books at reduced prices.

THRIFTY STORE offers employees a convenient, low-priced shopping area where they can buy snacks, small clothing, and variety items. Store is run by employees, not the company.

SPARKLING REST ROOMS—191 of them—feature improved ventilation, heating, fluorescent lighting, soundproof dropped ceilings of glass fiber, ceramic wall tiles, terrazzo floors.

mates for the entire project. A number of photographs of existing conditions were taken, and artist's sketches of the proposed new facilities were prepared.

The reception was very favorable. WE's board of directors okayed the first steps of the modernization.

The old receiving court provided for only four trucks at a time. It forced suppliers' trucks to wait their turn in a line along Cermac Road, often taking as much as two hours to get into the dock. Both truckers and the town of Cicero complained. The remodeled court has positions for 17 trucks and incorporates a central dispatching position, closed-circuit TV observation of all dock positions, dock levelers, pneumatic tube handling of receiving papers, and many other devices designed to speed up the processing of truck receivals. Result: not only improved receiving, but better relations with suppliers, truckers, and the community.

The new rest rooms provide modern accommodations for both hourly and salaried personnel. They have wall-hung fixtures, terrazzo floors, glazed tile walls, and improved lighting and ventilation. Many are located one above the other on six floors, thereby using considerable common plumbing.

The old passenger elevators in the Telephone Apparatus buildings were completed between 1906 and 1921. They were quite adequate at that time when the majority of the shop employees were located on the lower floors. But in later years it became necessary to use several freight elevators for passenger service. During the last 10 years the need had grown to a point where 11 elevators (including five freight elevators) were assigned to handling passengers.

The freight elevators used for passenger service operated at one-third the normal passenger speed, and had slow vertical bi-parting doors.

The new elevators (still under construction) will be installed in existing shafts and will be completely automatic with closed cars. They'll be programed to serve specific floors at different times of the day for express movement of people as required by shift changes, lunch periods, and staggered relief periods. Where the traffic is heavy and shaft sizes will permit, double cars will be installed in present freight elevator shafts to expedite passenger movement. In all, 14 or 15 passenger elevators will be provided.

very finest got top
update the Hawthorne Works.

A traffic study showed that rapid-movement elevators were not practical in the six-story buildings. The greatest time by far was spent loading and unloading passengers. This meant that wide, shallow cars (for easy traffic movement) would be a bigger time-saver than extra lift speed.

The outdated entrances were another sign of the plant's age. The main pedestrian entrance (which served the offices and was the entrance most used by visitors) with its iron gates and padlocks was hardly consistent with present-day industrial practice. Work is now underway to provide a modern, attractive entrance. The renovated lobby will include spacious waiting and reception rooms, parcel-checking facilities, rest rooms, and telephones.

The design of these gates and lobbies took special care. Some of the sleek, ultra-modern entrances now popular at new plants would be grotesque at Hawthorne. The old, conservative buildings could be compatible only with a subdued, handsome-yet-quiet design.

A new hospital is under construction. The present single-story structure is a building of approximately 12,000 square feet, constructed around an open paved court with load bearing walls and an underground piping and service distribution system. After careful study Hawthorne engineers decided this building would be costly to remodel and impracticable to provide with additional space.

The first floor of the plant's main cafeteria is being remodeled to give it an attractive environment and laid out so that a small dining area can be included. An additional cafeteria will be set up to relieve the congested facilities that now exist elsewhere.

Some of the new cafeteria facilities will include service counters for special "short-order" meals, conveyorized dish removal, and supermarket-type serving areas in place of conventional (and time-wasting) straight-line serving.

Hawthorne planners felt that some improvement could be made in the storage of scrap iron and ferrous materials adjacent to the foundry. This entire portion of the Hawthorne tract can be seen from several major highways. A suitable fence is being erected to make this area more attractive.

MANAGER'S OFFICE– A TESTING GROUND

Heading up the plant renovation is Richard F. Byron, Superintendent of Plant and Factory Engineering. Here, he greets visitors in his office where he's conducting a test of chairs to be used in the plant auditorium. They may not look it, but all are the folding variety, and one type will be chosen to supply the 326-seat auditorium. Byron asks visitors to sit on the various chairs, try to fold them and offer their comments. He's found that you can't judge quality by looks. And several chairs have proved almost impossible to fold without instructions.

Radiator at the rear wall will be removed when air conditioning, which is being supplied to all the offices, is installed. In its place will be smooth-faced panels that will conceal both heating and cooling units. The 200-ton chilled-water air-conditioning system will also service cafeterias, restaurant, hospital, and engineering laboratories.

. . . Turn the page

National attention focused on Hawthorne in the 30s. Again today it deserves a look as it proves the value of the well-built older plant.

BACKING IN, suppliers' trucks formerly had to wait to get to docks, tied up local traffic maneuvering into place. Now they come in another entrance, use this for exit only.

Hawthorne is now building an auditorium to seat 326 people. In the past it had used a gymnasium, almost two blocks from the main property. In some instances, the second-floor restaurant area had been used. Both of these were large, had poor acoustics, and were generally unsuitable for use as an auditorium.

The new auditorium will be serviced by two of the converted freight elevators. Purpose of the new facility is to keep groups of common interest together for engineering meetings, conferences, supervisory reviews, organization announcements and discussions, Hawthorne activities, and the like.

Elimination of double-occupancy offices for some supervisors at the assistant superintendent level is now in process. Hawthorne is the only WE location where double occupancy exists.

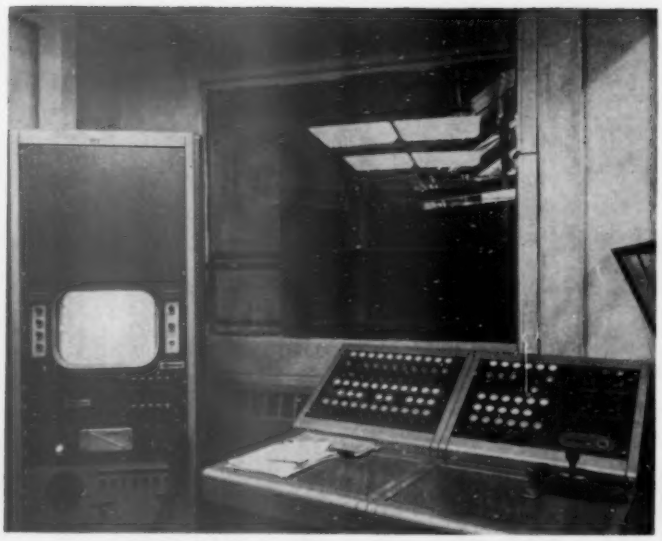
Finally, a number of employee services have been brought together from scattered parts of the Hawthorne tract. Now they're in a newly decorated, air-conditioned building. There's an employee store that offers snacks and sundry items, as well as small items of clothing (all at discount prices); a shoe store that sells both safety and regular footwear; an employee credit union; a well-stocked library; headquarters for the Hawthorne club, which coordinates literally dozens of employee activities; and facilities for conducting the plant's highly active evening school program.

Inside and out, the old plant is being rapidly brought up to date. By 1964 it will be a harder working plant than ever before. Production lines will move as smoothly and easily as those in a brand new plant. Employee facilities will hold their own with the very finest. Work areas will be clean, well-lighted, comfortable. Handsome entrances will blend with the dignified exterior. Hawthorne will be a virtually new plant—a modern productive giant for only a fraction of the cost of a totally new plant.

Can anyone turn an old plant into another Hawthorne? Obviously not. It takes a well-built, well-kept facility to start with. Sound engineering—which is evident in the modernization—is a tradition at WE. Says Joe Evans, "The Hawthorne Works is solid as a rock and beautifully maintained." If it weren't, the whole project would be money down the drain.

But a good building is only the beginning. It also takes sound planning and ingenious engineering.

Hawthorne planners spent hundreds of man-hours looking for the best ways to solve their gigantic problems. In the process, everyone was called upon to get into the act. Suggestions were welcomed—even



CLOSED-CIRCUIT TV allows the dispatcher to view all the loading docks (17 instead of the 4 formerly available). Pneumatic tubes handle the paperwork, cut walking time.

COMPLETE CONTROL of trucking is assured by this console with lights to indicate empty spaces. It's a far cry from first Hawthorne docks, designed for horse-drawn vehicles.

solicited—from anyone in the plant who felt he knew of a better way of doing his job.

Bold, skillful engineering permitted the installation of conveyors in places where "it couldn't be done." Putting a straight-line process in a multi-story building was something of a three-dimensional chess game. But WE's enthusiastic engineers came up with the unusual but practical solutions shown on the preceding pages.

Back in the late 20s and 30s Hawthorne opened industry's eyes when it was the scene of pioneering experiments in industrial psychology. Today, Hawthorne is offering industry another lesson. The giant plant is a monument to the wisdom of building—and rebuilding—long life into a factory. With a half century of experience behind it, Hawthorne may well be around to celebrate a 100th birthday.

THERE'S MORE TO COME as the modernization heads for its completion date in 1964. Workers are used to sights such as this, follow progress in the plant paper, *The Microphone*.

THE LAST UNIT rolls out of an area scheduled for modernization. While it's empty, maintenance crews move in to perform non-routine maintenance before new equipment arrives.

PAY RATES FOR KEY INDIRECT JOBS—IN 9 CITIES

All figures are average straight-time earnings in manufacturing industries except figures with asterisk, which are for **all** industries. They include incentive pay, if any, but **not** overtime, weekend holiday, or night-shift premium.

Weekly earnings are average salaries for standard work week.

	DETROIT, MICH. JAN. '61	JACKSON, MISS. FEB. '61	LOS ANGELES MARCH '61	LOUISVILLE, KY.-IND. FEB. '61	MINNEAPOLIS-ST. PAUL JAN. '61	NEWARK-JERSEY CITY FEB. '61	NEW ORLEANS, LA. MARCH '61	PITTSBURGH, PA. JAN. '61	SAN FRANCISCO, CALIF. JAN. '61
MALE JOBS, EXCEPT WHERE OTHERWISE SHOWN									
MAINTENANCE AND POWERPLANT:									
Average straight-time hourly earnings									
Carpenters, maintenance	$3.16	——	$2.96	$3.03	$2.83	$2.86	$2.60	$2.99	$3.14
Electricians, maintenance	3.30	$2.51	3.18	3.12	3.05	3.02	2.95	3.12	3.33
Engineers, stationary	3.31	2.31*	3.29	2.90	2.82	3.21	2.50	2.97	3.32
Firemen, stationary boiler	2.99	——	3.00	2.60	2.61	2.64	2.25	2.71	2.72
Helpers, trades, maintenance	2.57	——	2.52	2.35	2.45	2.24	2.04	2.67	2.67
Machinists, maintenance	3.31	2.51	3.16	3.10	3.05	3.02	3.01	3.14	3.27
Mechanics, automotive, maintenance	3.07	2.23*	3.00	2.83	2.78	2.94	2.31	3.10	3.29
Mechanics, maintenance	3.28	2.25	2.94	3.05	2.67	2.97	2.60	3.00	3.16
Millwrights	3.21	——	3.18	2.88	2.91	2.94	3.15	3.19	——
Oilers	2.64	——	2.44	2.45	2.44	2.43	2.31	2.63	2.58
Painters, maintenance	3.12	——	2.93	2.99	2.89	2.71	2.81	2.83	3.14
Pipefitters, maintenance	3.20	——	3.21	3.13	3.02	3.01	2.95	3.02	3.23
Sheet-metal workers, maintenance	3.23	——	3.03	3.05	——	3.02	2.89	3.08	3.13
Tool and die makers	3.42	——	3.19	3.38	3.15	3.09	——	3.27	3.53
CUSTODIAL AND MATERIAL MOVEMENT:									
Average straight-time hourly earnings									
Guards	2.70	——	2.42	2.41	2.28	2.29	2.24	2.52	2.51
Janitors, porters, and cleaners	2.38	1.32	2.11	2.03	2.02	2.04	1.62	2.16	2.35
Janitors, porters, and cleaners (women)	2.04	.81	1.99	1.69	1.71	1.82	1.25	1.97	2.16
Laborers, material handling	2.48	1.26	2.32	2.10	2.21	2.45	1.71	2.30	2.48
Order fillers	2.58	1.28*	2.18	2.35	2.17	2.39	1.37	2.30	2.73
Packers, shipping	2.43	——	2.25	2.13	2.12	2.08	*1.35	——	2.40
Packers, shipping (women)	2.38	——	2.08	1.43	1.67*	1.75	* .99	——	2.07*
Shipping clerks	2.69	1.87*	2.50	2.30	2.47	2.25	2.01	2.59	2.72
Shipping and receiving clerks	2.56	2.32	2.45	2.22	2.45	2.39	2.08	2.53	2.72
Truckdrivers, light (under 1½ tons)	2.53	1.15*	2.41	1.92	2.72	2.20	1.49	2.73	3.06
Truckdrivers, medium (1½ to and including 4 tons)	2.80	1.71*	2.74	2.45	2.66	3.28	1.86	2.92	3.09
Truckers, power (forklift)	2.56	1.29	2.48	2.31	2.31	2.43	2.14	2.48	2.61
Truckers, power (other than forklift)	2.68	——	2.43	2.37	2.38	2.18	*1.87	2.75	2.86
Watchmen	2.10	1.28	2.16	1.71	1.95	1.95	1.55	1.96	2.34
FEMALE JOBS, EXCEPT WHERE OTHERWISE SHOWN									
OFFICE, PROFESSIONAL, AND TECHNICAL:									
Average straight-time weekly earnings									
Comptometer operators	91.50	54.00*	90.50	65.50	77.00	77.00	64.00	83.00	86.00
Draftsmen, senior (men)	149.00	99.50*	117.00	119.50	111.50	120.00	127.50	138.50	119.00
Draftsmen, junior (men)	115.50	70.50*	93.50	89.50	88.00	89.50	91.00	107.00	91.00
Duplicating-machine operators	79.50	——	77.50	*56.00	60.50*	64.00*	——	72.00	77.50
Key-punch operators	93.00	58.00*	84.50	73.00	64.50	72.50	76.00	83.00	80.00
Nurses, industrial (registered)	108.00	——	105.00	97.00	93.00	95.50	107.00	101.50	105.00
Office girls	79.00	——	67.00	61.00	50.00	59.00*	*44.50	61.00	68.50
Payroll clerks	97.00	69.50*	91.00	75.00	70.50	78.00	70.50	86.00	91.00
Secretaries	111.00	71.00	98.50	88.50	83.00	93.00	87.50	100.00	101.50
Stenographers, general	95.50	59.00	88.00	72.50	68.50	78.00	71.50	85.00	89.00
Typists, class A	94.50	58.00*	85.50	70.50	66.00	74.50	81.50	82.50	83.00
Typists, class B	81.00	53.50*	76.00	61.00	58.00	65.50	66.00	74.50	73.50

Indirect labor pay; nine more cities report

From representative cities across the country, here is the latest report on pay practices for key indirect labor jobs—exclusive figures supplied by the U. S. Department of Labor's Bureau of Labor Statistics. They can help you check out your own wage patterns. Or they can serve as guidelines when you organize new supporting functions or revamp job specifications.

The whole area of indirect costs is management's ripe new target for cost cutting. To see how strongly FACTORY feels about these costs, read the memo on page 87.

Your plant's chance for fame

Three minutes of your secretary's time, applied to filling out the coupon below, can start your plant on the road to fame. That's all it takes to enter FACTORY's 28th annual competition for the Top Ten manufacturing plants built in 1961.

Winners in this contest will earn nationwide recognition and acclaim. The entire May 1962 issue of FACTORY will be devoted to them. Owners, architects, and builders will be our guests at the Annual Awards Dinner in New York next May.

After we receive the coupon, FACTORY will send you —or the person you designate—a questionnaire about the new plant. This will guide company executives in supplying the information we need in making a preliminary evaluation. Then Buildings Editor Herbert Lund will visit the top contenders. He will bring back the information needed for the final choice—which will be made by the full editorial team of the magazine.

Remember: Size doesn't count. Neither does location nor total cost of the plant. We're looking for plants built with good ideas, sound planning, and an eye for manufacturing efficiency. But you'll have to act fast. Completed questionnaires have to be in our hands by Sept. 29, 1961.

Take the first step today. Fill out the coupon and mail to:

HERBERT F. LUND
Buildings Editor
FACTORY
330 West 42nd Street
New York 36, N. Y.

My candidate for

FACTORY's "Top Plants of 1962" Awards:

Plant name.....

Plant address.....
(Street) (City) (Zone) (State)

Company name.....

Plant or company executive who can give FACTORY additional information:

Name.....

Title.....

Address.....
(Street) (City) (Zone) (State)

My own name.....

My company name.....

My company address.....
(Street) (City) (Zone) (State)

I have other plants to nominate. Please send me _____ additional nomination blanks.

EXOTIC ALLOYS

do bread-and-butter plant jobs

"Exotic alloys in our operation! You must be kidding! We're a small plant and our budget won't stand for luxuries."

If that's what you think, here's an eye-opener. Super alloys commonly associated with glamorous space-age applications are taking over many bread-and-butter jobs in industry—and doing them economically. Sure, these alloys are more expensive than conventional metals—often much more. But there's another side to the coin—long life.

Exotic alloys are being used for hard-facing, metalizing, sleeving, and as wear strips.

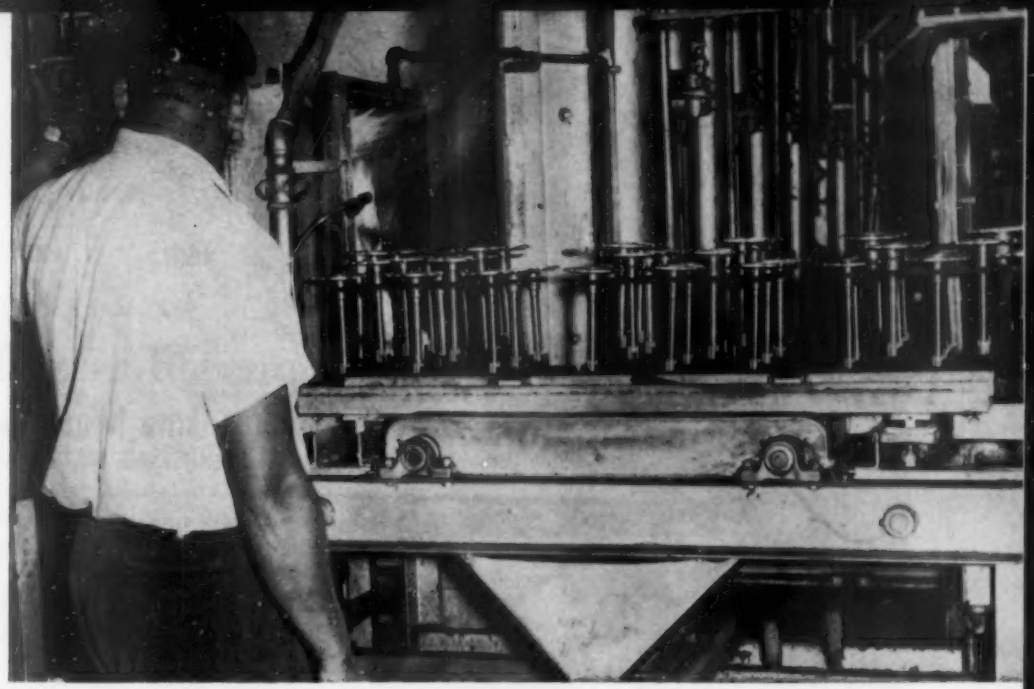
Here's how exotic alloys employed for everyday jobs are paying off in lower costs:

Hard-facing slashes costs $12,000

Hard-facing the flash line of hot forging dies with a high-temperature nickel-base alloy (Hastelloy Alloy C, Haynes Stellite Company, Kokomo, Ind.) is paying off to the tune of $12,000 annually at a top Detroit auto plant (right). Since use of the alloy was made standard, the plant has increased its yearly output of forgings—with existing equipment—by more than 250,000.

Each forging die can be hard-faced three times during its life. The prepared forging dies hold flash to a minimum, thus prolonging the total life of trimmer dies as well. This in turn leads to greater savings in costs for die metal, machining, and bench work.

The scrap rate has also been reduced from 2.1 to 1.4% since fewer forgings need to be restruck.



Torrid trays with longevity

These trays made of nickel-base jet alloys last an average of 21,000 hours at 1700 F. in this carbonizing furnace in a large transmission plant. And they need only minimum maintenance. The trays were previously made of conventional metals, lasted just 10,000 hours, and required periodic maintenance. The jet alloy was developed when strategic alloying elements were in short supply. Originally designed for jet turbine parts, it requires only small percentages of alloying elements, yet has great strength at high temperatures.

Turn the page

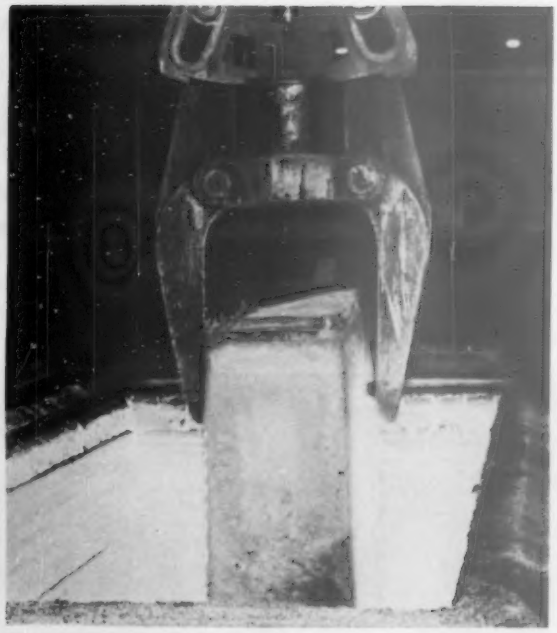
Alloy mothers jumbo guide rail

Maintenance is virtually a thing of the past for this massive guide rail at Pet Milk Company, Greenville, Ill. Thin strips of cobalt-base jet alloy are protecting the costly aluminum rail from wear and corrosion in a can-making machine. A continuous chain rides the rail, carrying with it some of the soldering acid. This, of course, means the danger of corrosion is ever-present. But since the strips were installed in late 1954 there has been no sign of corrosion of any kind.

Fixtures thrive in oxidizing furnace

Fixtures made of Hastelloy Alloy X are still in use at American Coldset Corporation, Paterson, N. J., after 16,600 cycles at temperatures ranging up to 2300 F. in an oxidizing atmosphere. Trays made of other materials were useless after only 4 or 5 cycles.

This nickel-base alloy has excellent resistance to oxidation and has many industrial heat-treating applications.



Corrosion alloy fights shock and heat

Hard-facing this tong bit with a corrosion-resistant nickel-base alloy has cut maintenance at Great Lakes Steel Corporation, Ecorse, Mich. Conventional hard-facing materials were formerly used to protect the bits against high-temperatures and thermal shock. This worked, but required twice as much maintenance as when the alloy is used.

The bits lift a hot heavy ingot out of the soaking pit and carry it to another area for subsequent processing. The hard-faced points are exposed to impact, temperatures of 2420 F., and thermal shock during lifting of the 24-ton ingot.

Nursemaid to embossed roll

A cobalt-base alloy is protecting an embossed roll shaft end from damage at Union Carbide Plastics Company's Bound Brook, N. J., plant. The alloy encircles the shaft end in a closed bearing. The rolls operate under high loads—about 2500 pounds—and at elevated temperatures. Even if the ball-bearing breaks down completely and goes undetected, the shaft end will not be scored due to the hard sleeves covering this critical section. Replacement of the sleeves and bearings costs considerably less than removal and machining of the shaft.

SPECIAL MEMO TO READERS

FROM: THE EDITORS OF FACTORY

SUBJECT:

The millstone of indirect costs

"We have paid far too little attention to indirect labor—from clerk to top management. Instead we have become preoccupied with direct labor costs and fringe benefits. We have overlooked the indirect costs of operation. This lack of attention has now caught up with us."

(Hubert G. Ebdon, president, Combustion Engineering, Inc., New York, in a recent address to managers and engineers.)

In the welter of excitement about automation, an insidious side effect has gone all but unnoticed. It's the increasing proportion of indirect costs to the total cost of manufacture. Until now mechanization has been typically aimed at direct labor costs—the costs of operating productive machinery. Consequently, the relative size of direct costs has declined, while the proportion of auxiliary services costs has risen. Present estimates are that manufacturing plants will spend over $50-billion on indirect charges in 1961. These costs have truly become a millstone around plant management's neck.

Indirect costs cover a multitude of manufacturing expenses. These range from blue-shirt costs like maintenance and material handling to white-collar costs like in-plant clerical help and supervision. Indirect costs include relatively fixed "overhead" expenses like heat, light, and depreciation—and variable costs like fuel, process water, and compressed air. They include employee-centered costs like safety, in-plant feeding, and medical services—and equipment-oriented costs like lubrication, waste handling, and power.

Put all your nominations for the indirect-cost label into a single basket, and you'll see why plant management today gives their control highest priority. Direct costs of production will continue to get their share of attention, of course. But the urgent target is for the costs nobody wants to pay—costs that are essential to running a plant but do not add value directly to the product.

The editors of FACTORY believe—as do so many industrial leaders like Mr. Ebdon—that indirect costs are your most immediate problem today. We promise to dedicate the next few months to finding out all we can about how to solve this problem. When we have completed our research, FACTORY will devote an entire issue to reporting in one place, at one time, all the useful information that can aid you in loosening the millstone of indirect costs.

THE LONELY SUPERVISOR

Who's the loneliest man in your plant?

Chances are, unless he's part of a most unusual outfit, he's the supervisor on the graveyard shift—the management man who comes to work when most others are about to hit the sack. He goes home about the time other supervisors are shifting their grey matter out of low gear.

His loneliness isn't eased by the fact that there may be several other supervisors, superintendents, foremen, or other management men on the night trick with him. They're busy, deep in their own problems, and perhaps a little groggy. So there's little chance for discussion and mutual aid.

The hourly employees on the night shift aren't much help, either. After all, *their* boss (Lonely Leo, as we'll dub the night-shift supervisor) is at hand; their tasks are the same as those performed by workers on the other two shifts. And in many plants they'll be rotating to one of the other shifts in a week or two, anyhow.

Result: The night-shift boss has a "loneliness quotient" greater than that of his colleagues on the other shifts. Managers who report for work in the mid-afternoon have at least some overlap with the day-shift top brass. And they get a chance to mesh in with day-shift line supervision, at least for a short time.

But lo, poor Lonely Leo!

The night-shift supervisor

He's the top management man on his shift; there's no one else handy to turn to when he's in trouble. Sure, he can telephone the plant manager ("Call me anytime!"), the maintenance boss, or the technical staff. But the answer he'll get will be from someone roused from sleep after a tough day's grind—hardly conducive to calm, sage advice. And unlikely to make Leo any less lonely.

Plant managers find their night-shift supervision falls into two groups. Occasionally, a manager will find a man (or men) who genuinely prefers to work from midnight to dawn—because it fits his personal obligations or pleasures, because he's used to it from previous experience, or because he's the rare fellow who's truly best satisfied as a "loner."

The plant manager treasures such a man. But even with these men plant managers have their doubts. Has the night man picked up the new spirit we're trying to instill? Is he giving quality close enough attention? Does he conserve lights, gas, water? Is he always alert to fire and accident hazards in darkened, idle areas of the plant?

In plants without contented moonlight management men, chances are the Lonely Leos are the greenest supervision, hired to replace someone else who has left or been promoted. Young men eager to make their mark, they nevertheless are a source of nightmares to plant engineers, inspection chiefs, production schedulers, general foremen. The nightmares of these men cover an amazing variety of trouble developing in the dead of night. The plant left hours earlier in good order has suddenly become a shambles. Major repair, rework, and rescheduling will be needed in the morning.

Night-shift supervisors command every activity in your plant for 8 hours out of every 24, just like their colleagues. Doing something to combat their feeling of being isolated—at a dead end—will pay off. You'll see greater productivity, better quality work, improved initiative and morale. There are precious few plants that couldn't stand a healthy dose of each. On the facing page are seven suggestions, all sound, all proven.

Is his status slipping?

Does Lonely Leo have his own mail box or does he have to shuffle through the day-shift manager's papers to find his mail? Does he have locker, desk, and cupboard facilities, or must he use a corner of someone else's desk, and hang his hat on the nearest pipe valve? You know (and *he* knows) that his hourly employees get the same facilities and equipment as the day-shift gang. If they didn't, you'd soon hear about it—from them or the union.

How does Lonely Leo make out? By recognizing his status and comfort in these simple, inexpensive ways you can increase his self-respect and stature.

"And send copies to . . ."

Many plants have routine or irregular meetings, attended by day-shift production supervision. How does "the word" get to Lonely Leo?

In some plants, it just doesn't. In others, day-shift supervisors are expected to pass along a summary of the meeting. Do they do it effectively? One solution is to designate someone to take concise notes, with special attention to new developments and decisions. These notes are then sent to night-shift supervision in memo form. (Incidentally, sending copies to the men who attended the meeting will re-emphasize the action to be taken and the results desired.)

The log that talks back

The log book is one of the time-tested methods of communicating with the "off" shifts. Entries are made daily, and Lonely Leo is expected to absorb the information as his orders of the day. But he can't argue with the log book, or ask for clarification. He's usually expected to initial the day's message and obey as best he can.

It's just as important to have a log book through which Lonely Leo can communicate to the daylight world. Give your night-shift people a log book through which they can talk back—not only to the general foremen level, but also to the maintenance engineer, technicians, schedulers, methods men, and so on.

A great deal of the graveyard-shift frustration can be erased if addressees of these notes *take* Leo's suggested action (or explain in writing why they didn't). Lonely Leo does not often think of staff departments as working for *his* benefit. A log book that talks back will help him realize he has an expert management team behind him.

"Do not disturb" . . . or should we?

The kindest thing we can do for Lonely Leo, it is generally felt, is to leave his off-duty hours undisturbed. It's hard for him to get enough sleep, so let's try not to call him at home. But some plant managers have found that Lonely Leo *appreciates* a chance to attend a meeting with other supervisors—provided he's given enough advance notice so he can arrange his off-duty rest and relaxation.

For example, if meetings are regularly held once a week at 4 p.m., Lonely Leo would probably like to discuss his problems and offer his ideas—even when it requires two trips to the plant that day.

A chance to show "his" plant

Top management people usually make it a practice to tour the production area during the course of the day. Not necessarily because of any specific problem, but just to keep in touch with shop developments. How often is this done during the night shift, or even first thing in the morning before Lonely Leo goes home? An occasional tour by high-ranking brass is taken as a real compliment by night-shift supervision. And this gives Lonely Leo another chance to swap ideas, to get some personal help with his problems, and to see that he is not forgotten.

Does rotation solve the problem?

Some managers attempt to resolve the problem of night-shift isolation by rotating supervisors among the different shifts. This may be okay in some cases, but it has disadvantages. The man on rotation barely gets settled to one routine—both at work and at home—when he rotates and has to start over. And no one becomes attuned to the unique problems of supervising the graveyard shift. Besides, this creates three times as many supervisors who feel unsettled, discontented, short-changed on opportunity.

Do you know I'm here?

Lonely Leo has one overbearing fear. In the quiet greyness near the end of his stint, it can turn him into a dangerously ineffective manager. This is the fear, justified or not, of being forgotten.

How does *your* plant select a man for a special assignment, a community project, a visit to a customer's or a supplier's plant? Most important of all, when a promotion opens up, is *every* qualified man considered? Even Lonely Leo?

Too often, he's left out because management unconsciously reviews only the men with whom they are in daily contact. When the night men *are* considered, they are often rejected because it would be so hard to get a capable replacement for the night trick. Keep Leo on the team. Make sure he's considered—and make sure he knows it.

Rate your plant housekeeping

How does your housekeeping program stack up? This simple yes-and-no test devised by Puritan Chemical Company, Atlanta, will point out the strength and weaknesses of your program. Pick up a pencil and check yourself. Then check your answers against the rating key at the bottom of the page.

	Yes	No
1. Have you recently calculated your annual housekeeping costs?	☐	☐
2. Do they include custodial, supervisory, fringe benefit, and sanitary maintenance costs?	☐	☐
3. Do you have a basis for comparing your housekeeping job performances with other well-run plants?	☐	☐
4. Is cleaning performed on a scheduled basis?	☐	☐
5. Are records kept to ensure protection of surfaces (i.e., resealing of floors)?	☐	☐
6. Do records show complaints, who made them, and the time it took to remedy the situation?	☐	☐
7. Is the complaint record reviewed periodically to see how the general situation can be improved?	☐	☐
8. Is housekeeping supervised on a centralized basis?	☐	☐
9. Have you recently checked your program with a possible reorganization in mind?	☐	☐
10. Have you studied current work methods and procedures with an eye toward savings?	☐	☐
11. Has full advantage been taken of the economies of mechanizing plant housekeeping?	☐	☐
12. Is a formal training program improving your workers' skills?	☐	☐
13. Do you have an efficient system for stocking and distributing equipment and supplies?	☐	☐
14. Are custodial facilities adequate in size?	☐	☐
15. Do you have a sufficient number of items?	☐	☐
16. Are they located effectively?	☐	☐
17. Do they have adequate furnishings?	☐	☐
18. Is the plumbing satisfactory?	☐	☐
19. Do you undertake employee awareness programs to build interest in housekeeping?	☐	☐
20. Are regular inspections held to avoid accident and fire hazards?	☐	☐
21. Has the area of each custodian's responsibility been fully outlined to him?	☐	☐
22. Does he fully understand these responsibilities?	☐	☐
23. Has a time study ever been made of housekeeping jobs?	☐	☐
24. Are man-hours spent in housekeeping in line with requirements for the job?	☐	☐
25. Have you considered appointing group leaders to cut supervisory costs and up efficiency?	☐	☐
26. Do cleaning schedules allow for seasonal variations?	☐	☐
27. Have you a plan for cutting or expanding the work force as business fluctuates?	☐	☐
28. Are you aware of and do you adhere to all regulatory statutes regarding housekeeping?	☐	☐
29. Have blueprints been used in assigning housekeeping tasks?	☐	☐
30. Has your accident rate dropped since the installation of your housekeeping system?	☐	☐
31. Do you keep your custodians from doing other jobs?	☐	☐
32. Do you contract outside work, when it can be done more cheaply than by your own staff?	☐	☐
33. Does top management show an active interest in housekeeping?	☐	☐
34. Is it satisfied with present levels of housekeeping?	☐	☐
35. Have standards been set as goals for your program?	☐	☐
36. Have acceptable performance levels been established for workers?	☐	☐
37. Has plant housekeeping been costed out, per department or per job?	☐	☐
38. If so, are these figures adequate to reveal unusual situations?	☐	☐
39. Have you means for comparing costs with other plants in your industry?	☐	☐
40. Have you a means of predetermining housekeeping requirements and costs for new buildings?	☐	☐

HOW TO SCORE YOUR TEST

Total up the number of no answers and subtract that number from your total of yes answers. Then check the resulting figure against the scale below. The answer may surprise you.

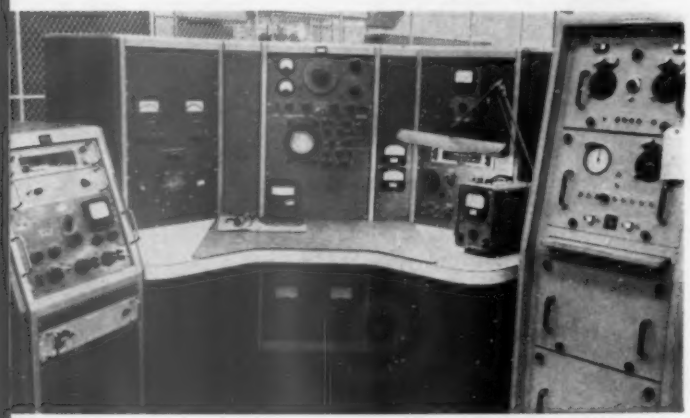
32—40 Your housekeeping is excellent.

22—30 Better than most plants.

12—20 Just average, room for improvement.

Below 12 Needs immediate attention.

SWIVEL CHAIRS and comfort-height benches give technicians straight-on view of all instruments on the three-sided panel surrounding them, make precision work easy. Power stanchions (left foreground) provide five standard voltages and frequencies. Test station (below) shows accessibility. Control panel for special voltages is below bench. Operators work in relative isolation, free from distraction under optimum seating and work-place layout. Yet they are as free to move about as with the straight benches previously used.



Clover-leaf bench layout saves testing time

By HARRY B. CLASSON, Jr.
Electronics Manufacturing Engineering
The Martin Company, Baltimore, Md.

"Who said test benches have to be lined up in rows?" That's what we asked ourselves when The Martin Company's calibration lab had to be modernized to speed instrument calibration.

Previously, test and repair benches were arranged along the laboratory walls and back-to-back in rows on the laboratory floor. At the back of each was a wide shelf about 20 inches above the bench. Technicians checked out the calibrating instruments they needed from the stockroom and mounted them on the shelf.

But several things were wrong with our old layout. When the shelf got crowded, calibrating instruments (oscilloscopes, counters, oscillators) had to go on the bench with the equipment being tested. Average calibrating time was high. From 1955 to 1960 it had been cut from 4.0 to 2.8 hours through better operator training, experience, and improved equipment. But highly trained personnel were still doing material handling. When equipment came in for calibration, time was lost while the technician determined what instruments were needed, walked to the storeroom, checked them out, and returned. Calibration instrument precision was endangered by frequent handling.

Martin's calibration lab involves 20 operators who perform about 225 calibrations and 92 checkouts on new equipment a week. So any improvement in operating productivity was well worth considering.

The new layout uses four-leaf-clover-shaped clusters of test panels with permanently mounted instruments. The clusters are made of standard rack panel components plus some custom sheet-metal work.

At each cluster the first position is set up primarily for calibrating oscilloscopes; the second position for power supplies; the third for elapsed-time meters and audio oscillators; and the fourth for square-wave generators, recorders, and amplifiers. Station four is also an alternate test position for elapsed-time input meters, counters, and oscilloscopes. Any station can be converted for specialized calibrating and testing units when needed. All instrumentation is interchangeable.

Power stanchions alongside the clusters provide 28-volt d-c, 115-volt 60-cycle, 115-volt 400-cycle outlets convenient to stations. At bottom of each station a separate panel supplies 115-volt 3-phase and 115/208-volt 3-phase Delta and Y power. Variable voltage autotransformers provide lower a-c voltages. Meters monitor the 60- and 400-cycle sources.

Uniform ventilation is provided by a direct driven fan vertically mounted just below the screen center of each cluster. Air is drawn in through filters at the bottom of each station, and circulates throughout the various instrument chassis.

Access doors allow the technician to enter the clusters to make necessary changes. If desired, any cluster can be dismantled, removed, and reassembled anywhere within the plant in less than two hours.

A test operator now has nearly double the instrument panel space without moving from his work position. He also has more usable work-bench space. Test work can be temporarily stored along the bench edges separating work stations.

So far, the clusters have cut unit test time from 2.8 to 2.0 hours, and the eventual target is 1.5 hours. They cost about $5000 each, excluding instrumentation. Future units will cost less.

As the cold war drones on, more and more plants work with Pentagon money. A vital job, yes. An easy job, never. Here's the inside story on...

The dangerous business of defense contracting

By LAWRENCE F. MIHLON, Associate Editor, FACTORY

Congress is worried that U. S. plant men are falling down on the defense job—a job that will cost the Department of Defense (DOD) $21-billion in 1961, almost double that figure in 1965.

The lawmakers are out to choke off loopholes that allow contractor and customer (DOD) alike to operate carelessly. They want no doubt left that the taxpayers are getting their money's worth from defense production.

Charges are being leveled at missile makers that shoddy production methods are responsible for weapon failures. Thus, even the missile lag is traced back to the plant.

Is the trouble in the plant? Is it in the Pentagon? Here's what months of study and talk with the men on the spot reveal.

Defense contracting is a dangerous business. Cancellation of a contract can mean your job. Failure to do a good job can cost your company more money than you're worth.

In defense contracting, what you don't know *will* hurt you. Commented one manager: "You've got to know as much as possible about every phase of the game, if you expect to succeed."

The defense business is a monster with several distinct heads: production, quality control, overall management, customer (DOD) relations, personnel, and paperwork. Malfunction of any one head can cripple the whole.

DEFENSE PRODUCTION

In defense work, traditional concepts of sequential manufacturing are forgotten. The defense plant is a sort of super job shop.

As one harassed plant manager put it during an interview with FACTORY: "Your work is concentrated more on advancing the state of the art than on achieving production efficiencies."

Most work for DOD is done on a cost-plus-fixed-fee basis (CPFF). Under CPFF contracts plant men are forced to see that R&D and production happen at the same time.

These contracts pay a negotiated fee, plus reimbursement for costs involved in meeting the contract. Obviously, there is grand temptation to pad the bill for all its worth. Few contractors can resist that temptation.

Production control is a hazardous affair, due to the constant changing of plans. In some more complex systems specs may change 100 or more times in the first few months of work.

If these changes are suggested by DOD, the matter is routine. But the slightest change you feel is necessary must be cleared with Defense. This can take months.

Thus, the men in the plant are faced with a murderous progression of peaks and valleys. Men and machines must be ready at all times to launch into the next phase of production. Chances for leveling are remote.

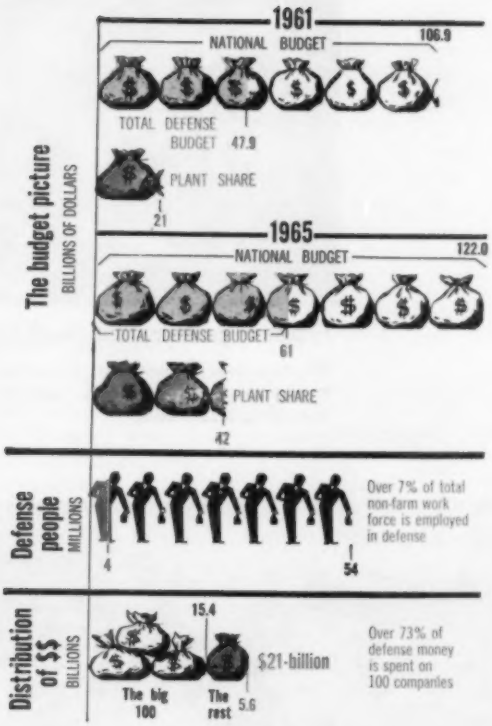
With many contracts, special equipment is required. It's expensive. It often has no application once the contract is completed. And it can only be bought under special arrangement with DOD. Otherwise—no reimbursement.

Parts handling and stores require entirely new control systems. Parts for each contract must be handled separately, even though they may be universal. More control personnel is needed than under normal operating situations.

Ordering spare parts is another area of woe. Since DOD usually has no firm idea on the future of the weapon, spare parts are only ordered when production is well under way. This means machines must be kept on standby for extended periods.

Also, surplus must be kept around long beyond normal plant retention periods. Indeed, it can't be disposed of without DOD consent.

Cost control and cost reduction programs require a certain "finesse" ("faith" might be a better



Defense production is big business. Total spending by the Pentagon for all goods and services amounts to almost half the national budget. The chart above shows that the biggest share of this money goes into the nation's factories.

By 1965, according to the experts, the plants will double their take of the defense budget. At the same time the Pentagon's total outlays will increase by only 15%.

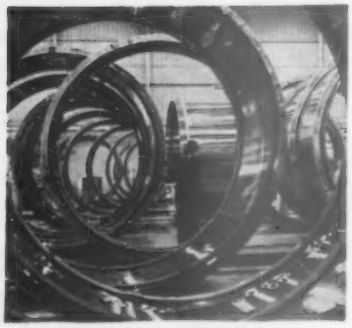
Today the defense business is dominated by 100 giant companies. They consume 73% of the production budget. Almost half of that amount, $7.6-billion, goes to 10 of the top 100 companies.

Bothered by this "monopoly," some lawmakers are out to increase substantially the small company share by 1965. Some sources say the rise will amount to more than 15%.

The chart is based on data supplied by the McGraw-Hill Department of Economics.

CONSTANT SURVEILLANCE of plant operations is the job of the military observer. His presence on the plant floor is characteristic of defense contracting. At left, resident Air Force Observer Capt. Charles Waespy inspects an installation at the Mineola, Long Island, plant of American Bosch Arma Corporation. He's flanked on the left by Arma's assistant director of product reliability, Horace Corigliano; on the right by William Alexander, plant manager.

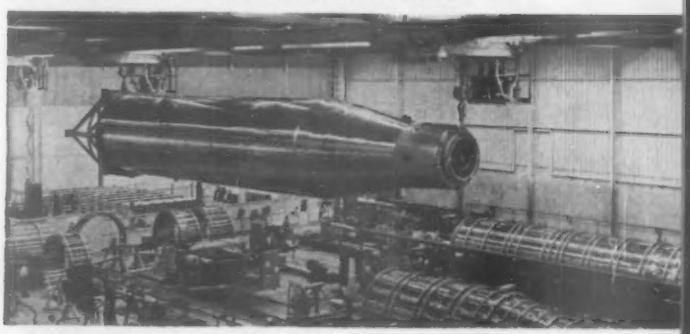
THE END OF A CONTRACT CALLED ATLAS



From a pattern in steel...

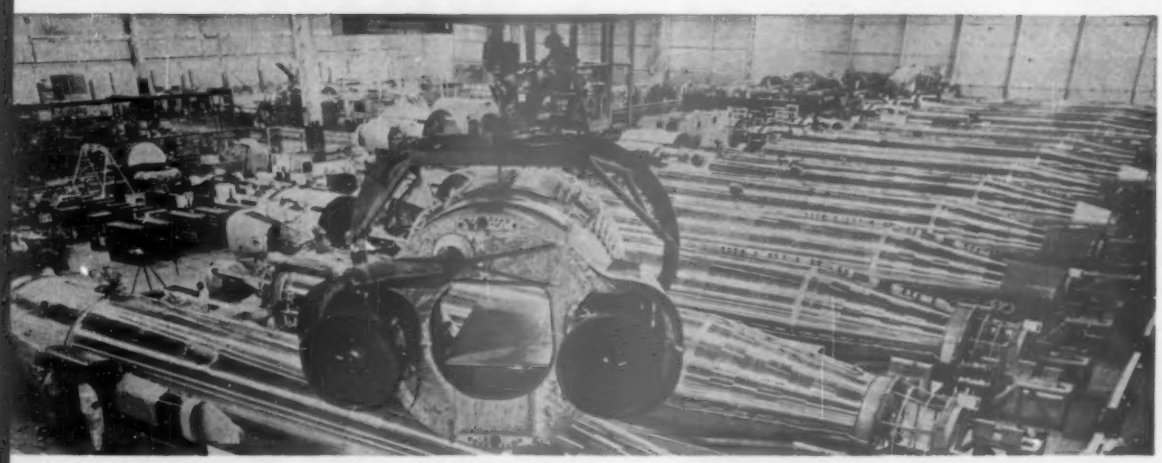
Stainless steel sections are lap-welded to form body tanks of Atlas intercontinental ballistic missile.

Photos courtesy General Dynamics/Astronautics, San Diego, Calif.



a 60-foot body is shaped . . .

Formers off, gleaming Atlas body starts ride to final assembly. Pressurizing keeps thin-skinned tube from collapsing.



engines are added to power the bird . . .

Suspended over the final assembly line, missile thrust structure and booster engines wait to be lowered into position.

then a last look—before leaving the plant . . .

Inspectors peer at area where Atlas separates—in flight. Booster section (foreground) drops off after a few minutes of flight. Then sustainer engines take over.

and planet.

The contract closed, Atlas roars off its launch pad to target 9000 miles away. The end is really only the beginning.

word). This is unneeded in commercial work where plant men can be reasonably sure that cost reduction efforts will result in increased profits. There is little incentive in CPFF contracts for plants to cut costs. Contractors' profits are kept constant by law at under 10% of total costs.

Incentive to cut costs becomes essentially a matter of patriotism. There is some pressure. It exists in the form of subtle threats that "you won't get another contract if you don't cut costs."

But very few DOD men can discern padding from real costs. And most contractors are skillful at making *all* costs appear vital. So the waste goes on.

Where DOD pressure is exerted, improvements are made. The pressure is often not pressure at all. One big prime contractor develops methods improvements in direct proportion to the size of a contract. If Defense ups the order, management goes after more improvements. Commercial life is not half as convenient.

Realizing they might be killing the golden goose, some contractors are attacking costs. Value engineering (VE) is the popular cost reduction tool.

In value engineering the attack is aimed first at the product. The function of each product part is analyzed to determine its necessity. If not essential, steps are taken to eliminate it. If needed, plant men must find ways to include it at lowest cost without impairing performance, quality, or reliability.

Though each company with VE has its variation, it generally works like this. A VE board is formed. Members are drawn from several engineering and management areas. The board examines each part made in the plant. It demands justification of the need for each. Though the board has no authority to make a change, its objective analysis brings attention to oversights. The board's report generally jogs project managers from their resistance to change. The board is overhauled with new members every six months.

Aerojet-General Corporation, Azusa, Calif., reports savings of $2-million annually on its Polaris ICBM contract, thanks to a VE program. Managers at Sperry Gyroscope Company, Great Neck, N. Y., estimate savings from VE programs at over 30% annually.

QUALITY CONTROL

In this one area pressures on men and machines are higher in defense than any other industry.

Defense wants quality, yes. But, unlike most consumers, it also wants reliability. DOD wants to know how far your product will go before failure. It's not enough to know simply that it will work.

By 1962 all DOD contracts will probably contain reliability requirements. Today only missile makers must apply these controls.

Reliability programs require special equipment. There is, for example, a fast-growing trend toward the use of automatic testing equipment. But it must be custom-designed and made. Demand is far ahead of current commercial capability.

Reliability is costly. In commercial operations quality control runs 7% of every sales dollar. In defense, reliability boosts QC to over 10% of every sales dollar. One company admitted recently that its reliability program adds 20% to every bill.

Still the missiles fail. Why?

Patriotism is apparently no incentive to produce better. Employees can't see what importance their small jobs play in the big picture. The problem is compounded by the tougher standards for defense work.

Reliability puts another burden on the employee. If he makes a mistake in assembly, *he* must report it. Unlike commercial QC, he can't wait until the end of the line to catch an error, then do it over again.

Managers must train their people to turn themselves in. Strict disciplinary action is required.

OVER-ALL MANAGEMENT

"There's no denying it. Good management makes the difference." Trite as it sounds, this observation was made by every one of the scores of managers interviewed for this report.

The reason is simple. In commercial situations you market a good product. In defense you sell capability first, product second. Good management speaks well for capability.

Many of the "big 100" spend as much on getting a defense contract (selling capability) as they do on executing parts of it. One manager told FACTORY his firm spends over $200,000 on a major bid presentation. Another manager compared the bid pitch to a Hollywood production. "Theatrics," he said, "play a major role in getting a contract."

Once a contract is let, what are the problems? They run across the board—affect every manager.

The defense mission demands speedy completion of work. Yet largely superfluous procedures make it impossible for plant men to move quickly.

It's estimated that this procedural waste amounts to about 25% of the cost of every weapon.

Few contracts are supported by 100% funding. Thus plant men tend to adjust costs more after the fact than before—as they do in commercial situations.

This funding dilemma helps to explain why defense business is concentrated in relatively few companies. Return on investment is very slow.

Working a defense contract is frustrating. Unlike normal plant operations, the customer has many heads. To get Atlas off the launching pad, for example, there were eight agencies calling the shots.

How bad the confusion gets depends to some degree on what you're making. If you're producing tanks, there's some opportunity to apply traditional management ideas. Not so with missiles.

The law requires a prime contractor to farm out as much of the component work as possible. The Small Business Administration stands ready to insure fair distribution of defense money. The assumption is that without safeguards the big boys would monopolize things.

Not so, say the big boys. One airplane maker, now in the missile game, said: "In the old days you could decide to subcontract when and if the need developed. Now you have no choice in the matter." He said there was

Robert S. McNamara, Secretary of Defense

E. V. Huggins, Vice President, Westinghouse

E. B. Staats, Deputy Director, Bureau of the Budget

J. David Wright, Chairman, Thompson-Ramo-Woodridge

JOSTLED BY CONGRESS, DOD AND ITS CONTRACTORS MEET TO DEBATE COSTS

The conflicting aims of the military for lower manufacturing costs, and of industrial producers for higher profits on defense contracts, were brought into sharp focus at a recent meeting in Washington.

Sponsored by the National Security Industrial Association (NSIA), over 500 managers of defense contracting companies met to discuss military procurement problems. The group's conclusion, as expressed by Conference Chairman E. V. Huggins, chairman of the executive committee and vice president of Westinghouse Electric Corporation: "The profit motive can be better used" as a stimulus to reduce the costs of defense production.

In the past, said Defense Secretary Robert S. McNamara, the profit motive has acted as a direct incentive to cost reduction through the wide use of fixed-price contracts. Anything plant men could shave from anticipated production costs was toted up as additional profit.

McNAMARA WANTS CHANGES

But in recent years, McNamara declared the trend has been away from firm fixed-price contracts to cost-reimbursement type awards in which producers are paid fees.

Reason for the trend, according to the Pentagon chief: advanced hardware which is ordered into production before all the development bugs are worked out of designs. The equipment lacks meaningful production cost experience and is subject to vast specification changes.

McNamara said the cost-type contracts "fail to give recognition to the central importance of the cost-benefit ratio."

He called for (1) simplified specifications and "rationalized" tolerances and performance standards; (2) reduction in development time, presumably by freezing design earlier; (3) more reliable cost estimates; (4) tighter controls on engineering changes to check whether design improvements are worth the added cost; (5) simplified administration and reporting on defense contracts; and (6) elimination of "uneconomic and inefficient conditions . . . that interfere with maximum productivity."

TO SETTLE PROFIT-COST RIFT

Two significant proposals were made to resolve the profit-cost dilemma. From Thomas D. Morris, Assistant Secretary of Defense for Installations and Logistics, came a plan for greater incentives for cost reduction and contractor performance through "cost-plus-award-fee" contracts.

Under the Morris proposal, contractors could be penalized 5%, or earn fees as high as 15% of a project's costs, depending on their performance. The amount would be determined after contract termination, rather than during contract negotiations. It would be specified by an independent board of production experts. They would evaluate a contractor's assumption of risk, technical breakthroughs, product quality and reliability, and in-plant efficiency.

A second proposal was made by P. E. Haggerty, president of Texas Instruments. He called for a shift away from "cost-orientation to price orientation" in development and initial production contracts. In effect, he urged more firm fixed-price contracts in which the military would "pay for a product according to worth rather than cost."

BUT THERE IS OPPOSITION

A panel of military and industry experts saw serious flaws in both proposals. Morris' idea was criticized because of its implication of "over-management" of contractor efforts and the prolonged deferral of profit determinations.

Haggerty's proposal was criticized by an Air Force official for assuming the existence of a "truly price-competitive environment." Asked the Air Force's A. J. Racusin: "How can you price out an item which is to be delivered years ahead, possibly in a configuration different from what you know now?" The contractor would want contingencies, he added, that would "negate the assumption of risk" that Haggerty's plan stresses.

When Capitol Hill watchdogs howl the Pentagon cannot be deaf. The same watchdogs are now howling at defense contractors.

just as much subcontracting in the old days—without government interference.

When the squeeze is put on the big prime contractors, their small "subs" get it twice as hard. Small companies are often caught in the middle of priority fights among divisions of bigger firms. In one case, a sub made identical parts for two big-company divisions. Wrangling over delivery priority consumed three weeks' vital time. Obligated to both, the sub could only wait until the difference was settled.

Talks with a score of small plant managers revealed a favorite method of padding the defense bill: Load up with as many inspectors and expediters as possible.

Trouble is, so many company inspectors have no real function. It's fairly common for a score of prime inspectors to visit a sub's plant on the same day. Few of the men know each other. They're inspecting the same thing. The plant is already certified by DOD.

When a contract is completed, it hardly seems worth it. Cost reductions and methods improvements should increase profits. But in defense contracting all profits are subject to renegotiation. You're exempt only if your product is a standard commercial item.

The culprit is the 1952 Excess Profits Act. Created to guard against excess gains during the Korean war, the Act expires June 30, 1962. Most plant men—and many Pentagon people—hope it will die. They feel this would permit bigger in-plant cost savings, and greater profit-tax income for the nation.

CUSTOMER RELATIONS

When you goof on the defense job, the Pentagon understands. It cooperates. It does, that is, if *you* tell them you goofed.

Just don't let *them* catch the goof.

The defense business abounds with military observers. They patrol your plant floor; audit your books; make suggestions; write reports. They can make your life miserable. They can be helpful.

If your plant is big enough and your contract fat enough, you'll have to provide quarters for them. At larger plants it's not uncommon to have over 100 military personnel in residence.

Many DOD men ask helpful questions, write intelligent reports. Just as many do not. Plant men complain that many inspectors ask for useless information. They do it, critics say, to protect themselves against Pentagon glances at any lack of paperwork.

There is serious concern over the qualifications of DOD observers. Experienced plant men question their technical savvy and ability to evaluate plant operations.

One company has had to set up an indoctrination course for resident inspectors. It lasts up to four months. It costs about $1000 per man, and handles up to 25 men a year. The company *says* it absorbs the cost. Other firms have similar programs.

Men running the programs say DOD is unrealistic about what observers should be paid, what they should know, and what they should do once they're on the job.

Cost reduction suggestions do come from military observers. No written edict says they must be accepted. But beware if you refuse without good reason.

These observers audit systems, not the product itself. Thus your management methods make the difference.

Most plant men report relatively good relations with DOD observers. Willing to learn, they go half way to work out differences. When trouble develops, it's usually at the personality level.

PAPERWORK

Defense contractors are strangled by unnecessary paperwork. Reliable estimates say it costs the taxpayer $250-million a year.

Virtually every move made, every penny spent, must be recorded for a score of individuals and agencies. Only rarely, it is contended, are these reports read.

The paperwork problem is begun by DOD. Big primes compound the felony in dealings with subcontractors.

One giant ordered two parts from a well-established sub. To close the deal, the sub had to complete a 100-page questionnaire for the prime. It covered everything from financial status to employee facilities. The sub refused—with good reason. It was approved by DOD and SBA. The parts ordered were essentially stock items. The deal is still pending.

Most primes require a questionnaire of 5-10 pages with every contract—regardless of how many times they have dealt with the sub in the past.

The paperwork problem is at its worst in the specifications area. Specs are usually overwritten. Thus, the plant man's job becomes one of disproving need for specifics rather than filling actual requirements. Critical time and money are lost.

Plant men complain that top men should be writing specs. They're not.

THE FUTURE

That's the defense story today. Will it be much different tomorrow? Chances are it will not.

The Pentagon insists it is not deaf to criticism. With Congressional watchdogs howling, it cannot afford to be. Now the watchdogs are howling at the defense contractors. They also cannot afford to be deaf.

PM conference in Japan spurs better plant maintenance

A special report from our Tokyo News Bureau

JUST LIKE OUR OWN, the Japanese conference displayed attractive exhibits (above) ranging from tools and instruments to air-conditioning units. Stimulating seminars (like the one below) covered dozens of management and engineering topics.

DIFFERENT FROM OURS, their conference provided free counseling (above) by experts who offered help in PM, budgeting, layout, training, and techniques. Helpful literature (below) answered hundreds of maintenance management problems.

PM is now a part of the Japanese maintenance language. To them it means both preventive and productive maintenance. This symbol (as shown at the left) was the motif of the second annual National Plant Engineering and Maintenance Show and Conference on June 6-10 in Tokyo. You saw it from the street in big letters over the entrance to the Metropolitan Industrial Hall. You saw it on every program cover. And it met every turn of the eye inside the building.

According to the Nippon Management Association (which sank $45,000 as principal sponsor), some 26,000 visitors roamed through four floors of 171 exhibits. Another 4500 executives attended 30 conference lectures. Even discounting some possible inflation in such impressive attendance figures, they exceed those of the 1961 national U.S.A. maintenance convention. And they establish at least one fact: Industry in Japan is reaching for better plant maintenance. It has to, if it hopes to utilize the facilities created by its vast technological expansion. For example, this year will see a $334-million investment in petrochemicals, an unborn industry 5 years ago. Japan's rate of growth in productive capacity tops all nations—expected to be 17% over 1960 in 1961. Its proposed 1961 capital plant investment of nearly $10-billion stands out against a total 1960 GNP of $35-billion.

An Association spokesman tells us the entire project was aimed at two targets. The exhibits were geared mostly to the younger generation, which has accepted modern **PM** and maintenance management techniques and wants more details. For example, one display (by UNIVAC) set up sample plant situations and worked out electronically how **PM** could cut maintenance costs. The conference lectures, however, were aimed at simplicity to convert older, tradition-bound executives who have yet to be convinced of the virtues of **PM** and other modern techniques. Yet some sessions did take on advanced subjects, such as industrial engineering in maintenance, economy study of capital investment, analysis of plant capacity, shutdown control, and analysis of breakdown causes. Six sessions concentrated on various facets of **PM.** It remains to be seen how soon all these "scientific" maintenance management tools can pierce the armor of the archaic structure of management that still exists in Japan.

In substance, character, and conduct, the Tokyo convention resembled its older U.S.A. counterpart. It differed in that sessions extended over the five full days of the show. Also, the Association provided a free advisory service, and maintained a literature room covering maintenance techniques, movies, slides, and other aids (two bottom photos). A greeting from L. C. Morrow, general chairman of the annual U.S.A. conference since its inception in 1950, hung in the place of honor in the entrance hall.

No doubt the Tokyo convention reflected Japanese plant maintenance at its best. But one fact is significant. These people understand the jargon of maintenance management techniques as used in the U.S.A. They know the meaning of work sampling, methods study, work simplification, operations research, and, of course, **PM.** A few are already using them. What has taken the U.S.A. 5 to 10 years to pioneer and develop is waiting for quick adoption in Japan when the maintenance function really gets rolling.

Available now in either 10-channel or 20-channel model

"620" Esterline Angus Recorder with Tempen*

Instead of ink, the new "620" Event Recorder with Tempen uses *electrically-heated styluses of stainless steel.* Torture testing reveals they will endure 20 years of continuous operation and still respond in less than 1/20 of a second!

The "620" also uses special chart paper with a non-wax finish, eliminating the danger of marred records caused by external heat, rough handling or discoloration from strong light.

Adaptable to hundreds of research, production and maintenance uses, the "620" can reveal the productive and non-productive time of any or all machines in a plant. Still other uses include circuit breaker action, psychological testing, qualitative analysis and conveyor operation.

Economically priced, the new "620" with Tempen is another versatile product of Esterline Angus master craftsmen.

For more detailed information, write for new "620" with Tempen descriptive folder. Address: ESTERLINE ANGUS INSTRUMENT COMPANY, INC., Box 596B, Indianapolis 6, Indiana.

*new event recorder with *inkless* method of writing . . . operates more than 50 days without a change in charts

Excellence in graphic recording for over 50 years—ESTERLINE ANGUS

For more facts Circle 446 on Reader Service Card

EQUIPMENT NEWS

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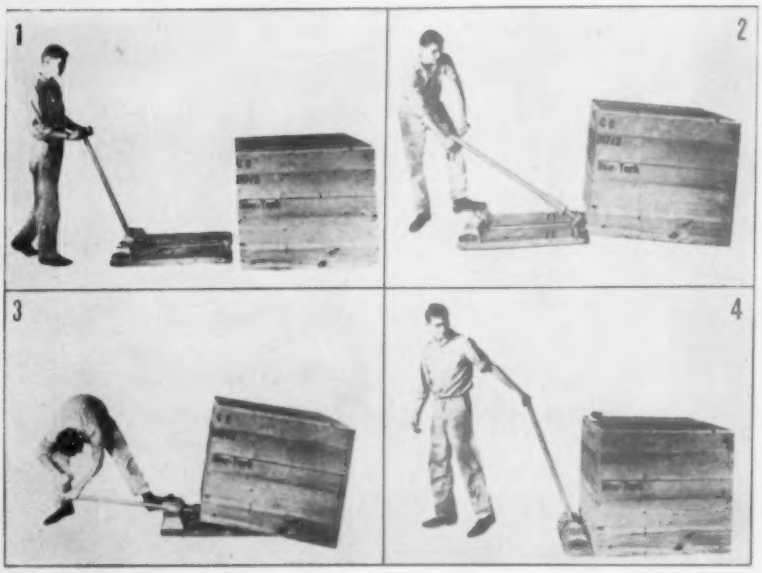
Lifts and lugs flat-on-the-ground crates



Crates and cases resting flush on the ground are loading problems—there's no place to grab hold. Now with Crate Mate, you don't need gripping space. It easily loads and moves flush-bottom crates weighing up to 1000 lb.

To start loading procedure, operator rotates steering handle 90 deg., permitting it to slide from front (photo 1) to rear of truck. Special steel "tongue" on handle wedges beneath crate and lever action tilts it from ground (photo 2). As truck goes under, rollers simplify loading (photo 3). Handle slides to front for hauling (photo 4). A sharp tug on handle dislodges load.

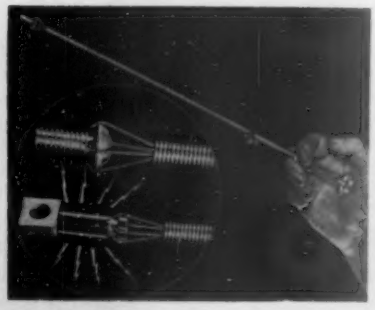
Moves crates with either lengths or widths from 3 to 6 ft. and ground clearance under 2 in. *Stokvis Multiton Corp.* (Circle 88)

89—Shoptrol system feeds back information from work station to panel on master console. Counters record delay, run and set-up time. Keeps data on inventory, maintenance. Eliminates paperwork. *General Electric Co.*

90—Ceramic infra-red heater, in 150 to 1000 watts, averages over 10,000 hours of life. Withstands heat, corrosion. Elements to 400 watts with gold coating reflect 90% of rays. *Roundout Marketing Associates, Inc.*

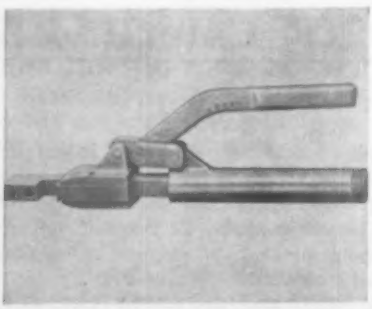
91—Hot food vendor serves soup or foods such as beans and franks, or chili con carne. Dispenses four selections priced from 10 to 35¢. For small plants, handles up to 52 cans. Price: $200. *Le Bron, Inc.*

92—Steel building, 12 to 16 ft. high, 30 to 80 ft. wide, can be erected quickly from off-the-shelf components. Trusspan package includes siding, roofing, doors. No special foundations. *Republic Steel Corp.*



93—Retrieving tool uses clamp or magnet to pick up tools, screws, and other articles from inaccessible places. Pushing plunger opens four steel "fingers" of clamp. Clip on side of shaft has removable magnet held by clamp to draw object. *Boroughs Tool & Equipment Corp.*

94—Autopromt enables programer, working from engineering drawing, to describe in shop language surfaces of part to be milled. Instructions are converted to tape for use by automatic machine tool. Slashes machining, lead time. *International Business Machines Corp.*



95—Nut gripper quickly and easily loosens tight or "frozen" bolts. Self-locking grip holds nut with 7000-lb. clamping force. Adjustable jaws hold any size from ½ to 2 in. across face. Has reversible inner and outer jaws; extra jaw for small nuts. *Rodgers Hydraulic, Inc.*

Turn the page

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BARREL-TO-BEARING
LUBRICATION...

product and profit boosting production tool

Lubrication is a vital production tool—proven as the means to step up production . . . cut downtime . . . increase machine life and efficiency! A lubrication system should be as carefully selected as any other major production tool in your plant. Investigation will show that the finest plan is Alemite Barrel-to-Bearing Lubrication.

Every day, more and more profit-minded plant men place their trust in Alemite Barrel-to-Bearing Lubrication. With either electric, air or hand operated equipment, it provides the cleanest, fastest, most efficient transfer of lubricant from refinery barrel to your machinery's bearings. It can fill your plant's needs for high pressure lubrication, servicing oil reservoirs, filling gear housings, and refilling grease guns.

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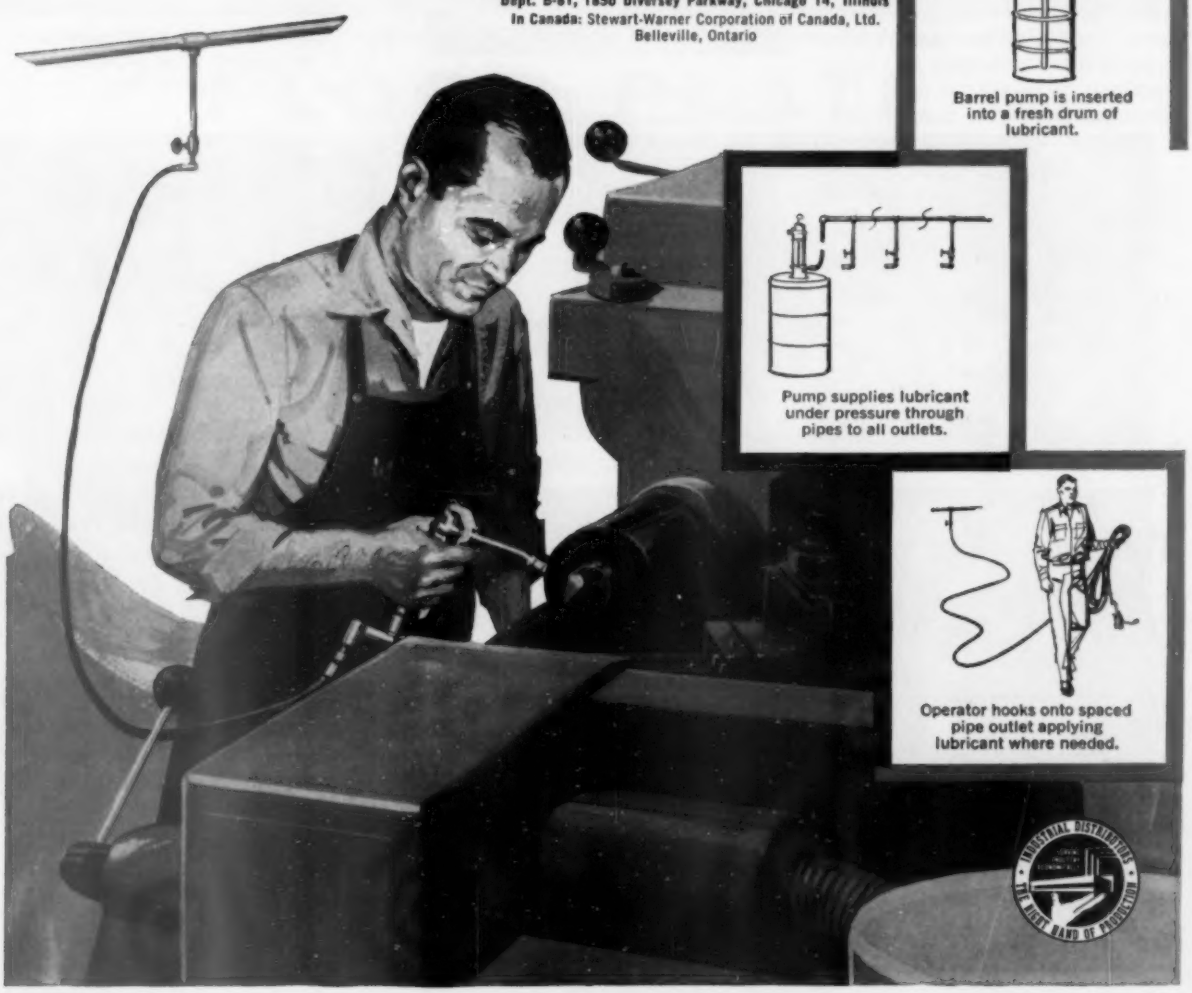

Barrel pump is inserted into a fresh drum of lubricant.

Pump supplies lubricant under pressure through pipes to all outlets.

Operator hooks onto spaced pipe outlet applying lubricant where needed.

INDUSTRIAL DISTRIBUTORS THE RIGHT HAND OF PRODUCTION

For more facts Circle 447 on Reader Service Card

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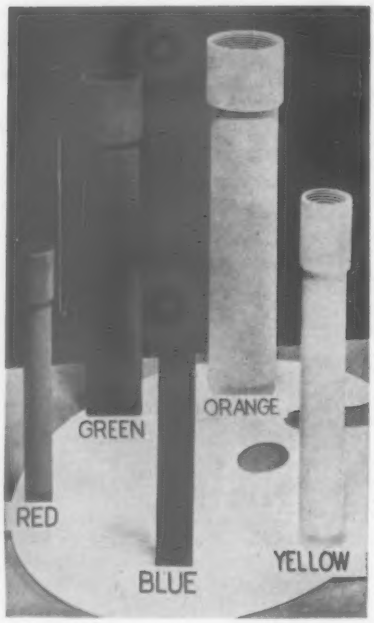
Conduit color gives a line on circuits

How about sprucing up your plant with a little color—colored conduit, that is? It not only has many practical applications, but it brightens up the place as well. And you have a palette of colors to choose from, according to the photo at right. This doesn't have the right color? Then you may select special colors to suit your particular décor right down to matching elbows and couplings in all sizes.

This conduit is rigid steel Sherarduct. The color is baked on at the factory. No need to paint at job site, a saving to you of about 7¢ per ft. if you figure cost of priming and second coats over galvanized conduit. And it also reduces maintenance costs. A painter doesn't have to go to dizzying heights or around machinery to re-paint conduit. Furthermore, there's no need to erect scaffolds or other equipment.

Other advantages: If power failures have your maintenance men up ladders trying to distinguish between drab electrical lines and drab telephone, or intercom lines, you get the picture. It has a safety use, too. For example, if you choose red for high voltage lines, it serves as a warning to electrical repair men. And when extending and relocating lines, color of conduit tips you off to the type of circuit.



This color-coded conduit is protected against corrosion by Sherardizing. This is a galvanizing process in which zinc is actually alloyed to the steel walls and threaded ends. Color is applied in final stages of production. Conduit and couplings are dipped in bath of special acid-resisting MVC-1 polyvinyl to which color pigments have been added. Colored part is then moved slowly through ovens where finish is baked dry and hard for additional corrosion protection. *H. K. Porter, Inc.* (Circle 96)

Tom Thumb of metal-clad switchgear

What's new in switchgear? Just about the smallest package made anywhere in 5- and 15-kv. ratings. A typical 5-kv. indoor unit is 26x58x63 in.; a 15-kv., 36x85x75 in. Space-saving outdoor units are also available in these ratings.

Other advantages: higher pressure increases contact life; hollow primary conductors improve internal cooling. Auxiliary controls mounted on breaker eliminate separate testing controls. Breaker draws out for easy maintenance. *Moloney Electric Co.* (Circle 97)

98—Elevating table handles loads too heavy for man to carry but too light to require crane, such as dies, parts, castings. Foot-operated hydraulic table has 2000-lb. capacity. Rolls anywhere on casters. Can be raised from 27 to 44 in. Has floor lock. *Barworth, Inc.*

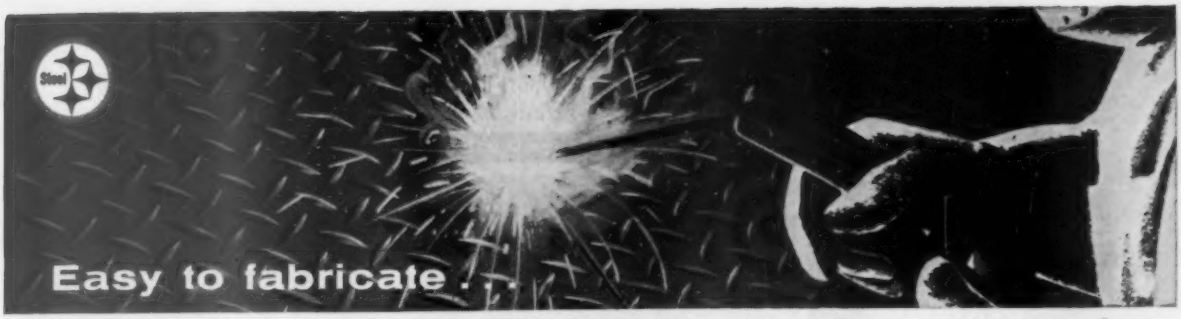
99—Mobile radio Scrambler plugs into any standard FM radio at fixed station for garbling messages. Operator switches easily to transmit in either scrambled or clear language. Unit resembles oversized telephone handset; weighs 24 oz. Factory-coded. *Delcon Corp.*

100—Centrifugal pump for chemical and other processing comes in 14 sizes from 1 to 5 in. in two series. Casing studs are welded. Comes with packing or mechanical shaft seals. Withstands sub-zero to 350 F. temperatures at pressures to 250 psi. *C. H. Wheeler Mfg. Co.*

101—Autotran automatically tests electrical components and circuits, classifies data, and computes trends. For in-process testing and quality control. Teamed with computer, the device prevents failures in product or process before scrap is generated. *General Electric Co.*

102—Audio alarm system spots intruder who hides until plant closes. Automatically trips signal to monitor up to 5 miles distant. Guard can flip switch on monitor to listen for sounds. Normal noise won't trip relay. *Powers Regulator Co.*

Turn the page

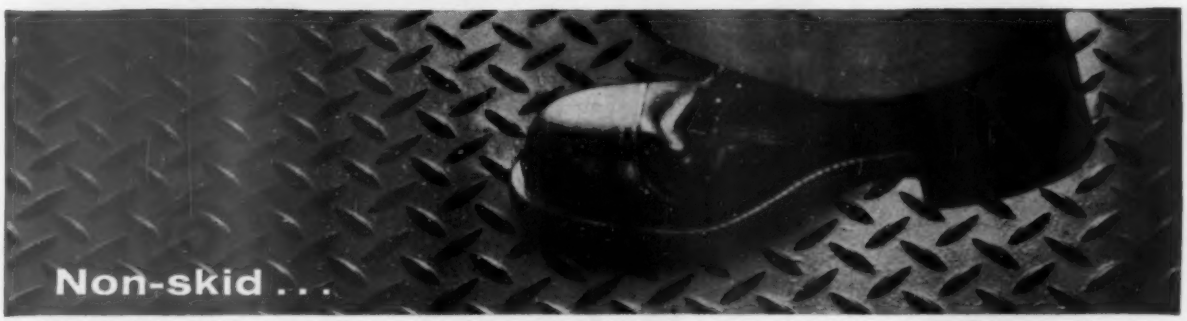


Shear, form or weld A.W. Super Diamond with standard shop equipment. Pattern matches any angle.

SUPER DIAMOND

Sweep, hose or mop A.W. Super Diamond. Water drains off in all directions. No pockets to hold dirt.

FLOOR PLATE



Reduces slides and slips. Super Diamond puts safe footing on steps, ramps, aisles; aids traction even if wet.

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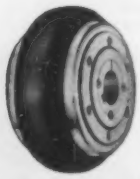
Save space, weight and cost!



DODGE PARA-FLEX
The Flexible Cushion Coupling
with the 4-way flex!

FLEXIDYNE
The Dry Fluid Drive
New soft starts — overload protection

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Begins on page 100

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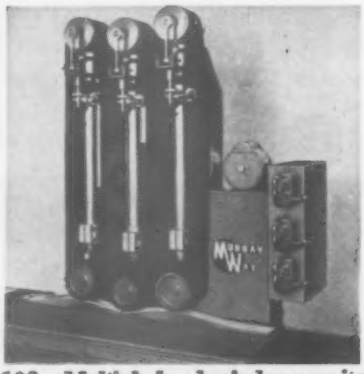
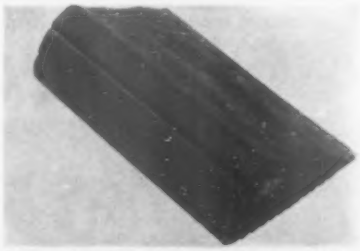


103—Multiple head grinder permits simultaneous rough and finish grinding of parts in one pass. Handles long or short, wet or dry, and flat, formed or contoured parts. One motor drives three heads. Can be conveyor-fed. Uses a 5x90-in. belt, adapts to others. *Murray-Way Corp.*

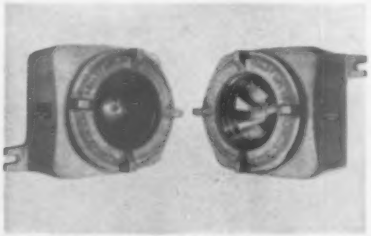
104—Truck battery has increased capacity to 85 amp./hr. per positive plate with no increase in dimensions. Offers maximum power per cu. in. in its size. Boosts small truck workload capacity. In 11 sizes with 11 to 33 plates per cell. *Electric Storage Battery Co.*

105—Trash baler compresses paper, contaminated wastes or reclaimable material in standard 55-gal. drum. Easy manual operation. Ratchet handle exerts up to 4000-lb. pressure. Rustproof; has no exposed gears. Rugged frame and metal base. *Vernon Tool Co., Ltd.*

106—Air stapling plier has deep throat for sealing recessed-end cartons, corrugated bags, shipping envelopes up to 4¾ in. from edge. Four models hold 210 staples 3/16 to 9/16 in. long. Uses 45 to 90 psi. air pressure. Light, easy one-hand operation. *Bostitch, Inc.*



107—Safety wedge, with cushion surface and non-skid tread, holds rolls of paper firmly on floor, platform, truck. Bars, drums or pipes can be stacked on floor without racks. Cradles containers on bench. Handles rolls from ½-in. to 4-ft. diameter. *John G. Shelley Co.*

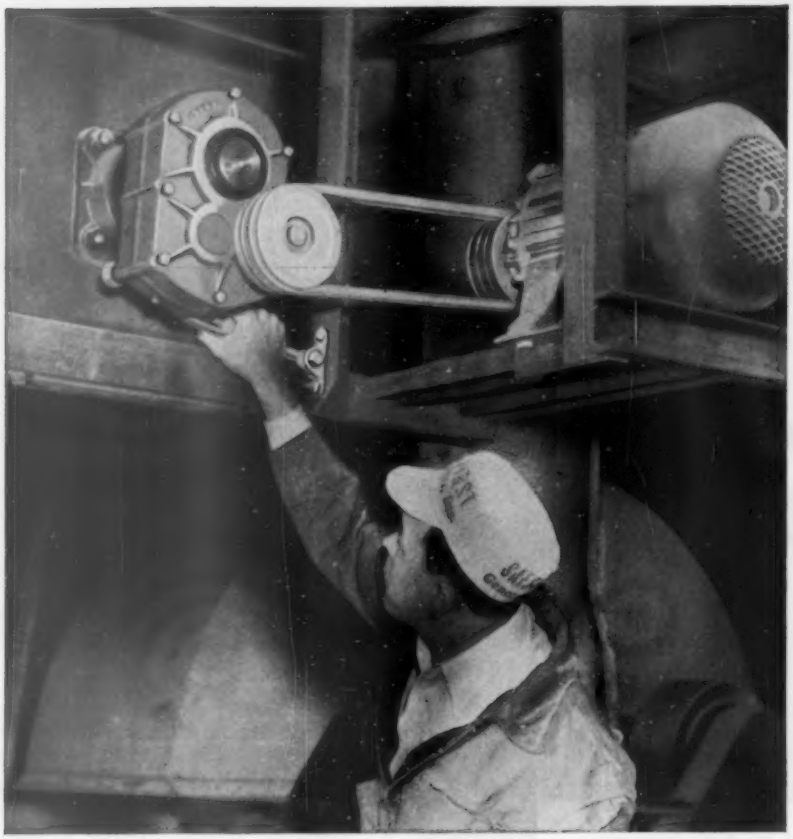


108—Infra-red detection system scans up to 350 ft. Operates night or day, indoors or out in —40 to +140 F. Interrupted beam trips relay which activates auxiliary alarm. Tattleguard is explosion-proof. Fully transistorized, operates on 12 v. d-c. *Alnor Instrument Co.*

Turn the page

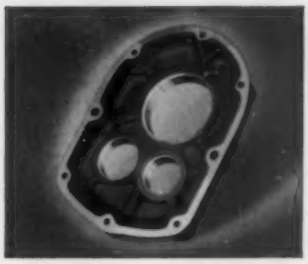
...the quality-engineered package

that simplifies speed reduction

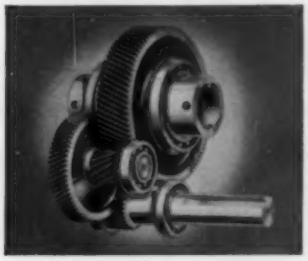


DODGE TORQUE-ARM, America's most widely used shaft mounted speed reducer, will save money for *you.* No foundation, no sliding motor base, no flexible coupling, no installation fuss. Developed and perfected by Dodge, this reducer has been so widely accepted in industry that it is now built and stocked in this unmatched range of sizes and models: capacities up to 170 hp; output speeds from 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; speed ratios up to 175 to 1 with correct selection of speed reducer and V-belt drive. Built-in backstop available. Also positive overload release. Vertical models. Flange mounted models. Special application models ... Go modern—go Torque-Arm! See your Dodge Distributor, or write us.

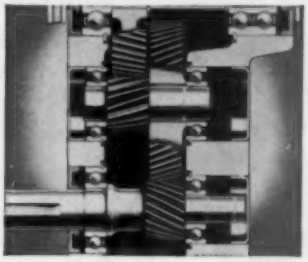
Dodge Manufacturing Corporation, 400 Union St., Mishawaka, Ind.



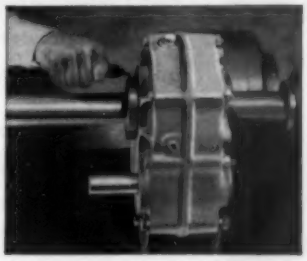
Rugged, semisteel housing holds bearing seats in line for entire life of unit. Laughs at loads. Corrosion resistant.



AGMA rated helical gears. Soft cores withstand shock; hardened surfaces defy wear. Teeth are crown shaved.



Gears are located *between* bearings and carry their loads without strain. Longer life, higher efficiency.



Unit slides completely onto shaft and locks on *both* sides of housing. This baby stays *put*—runs truer longer.

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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

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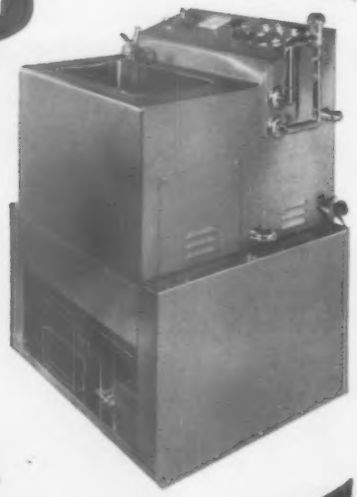

SOUND WAVES GET PRECISION PARTS CLEANER, FASTER

When Detrex developed Soniclean® (ultrasonic metal cleaning) it provided manufacturers of missiles and other precision products with an amazingly efficient new cleaning process.

In Soniclean equipment either aqueous or chemical solutions are agitated by high-frequency sound waves—penetrating apertures and passages which were difficult or impossible to adequately clean with previous methods.

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Spray Booth Compounds
Industrial Washers

Begins on page 100

EQUIPMENT NEWS

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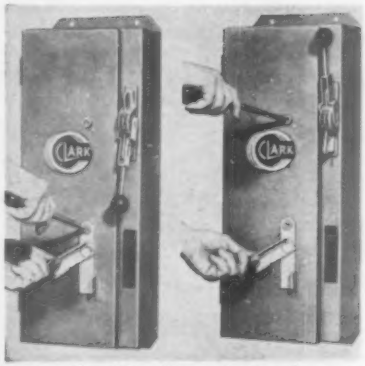
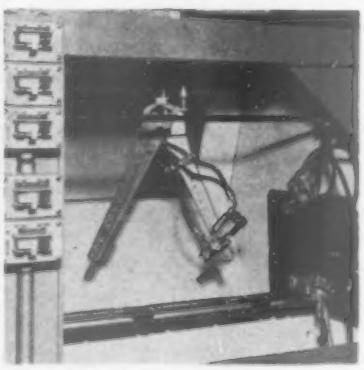


109—Combination starter features visible-blade switch which cannot be turned on with door partially ajar. Maximum safety—can be opened in "on" or "off" position only after multiple-step operation. Contactors in sizes 0, 1, or 2, 30 or 60 amp. *Clark Controller Co.*

110—Vinyl liners are low-cost way of restoring old chemical storage and processing vessels. Resistant to acids, alkalines, and salt solutions, and some hydrocarbons. Rusty, pinholed or cracked tanks of most shapes and sizes can be relined. *Comar Plastics, Inc.*



111—Rotating spray gun operates at super speeds up to 750 rpm. Boosts production rates up to 10 times. Combined with special conveyor belt, it can paint parts at a 10-in./sec. rate. Gets into folds, corners, and ridges for perfect coverage. *Finish Engineering Co.*

Turn the page

E. W. Ferry Screw Products, Inc., daily produces more than two million fasteners of many types for the automotive, airplane and appliance industries. This company also pioneered volume production of stainless steel screws.

Pittsburgh COLOR DYNAMICS® Painting System increases efficiency... improves morale

- **Lessens physical fatigue of workers**
- **Relieves eyestrain**
- **Helps eliminate accident hazards**
- **Costs no more than ordinary painting**

• **Both workmanship and production** were improved by Pittsburgh COLOR DYNAMICS in the E. W. Ferry Screw Products, Inc., Cleveland plant. It can help *your* firm achieve like results.

• **This scientific painting system,** based on reactions to the *energy* in colors, improves morale by making work areas more cheerful. Focal and eye-rest colors on machines help operators see their work better, thus reduce fatigue, boost efficiency. Safety colors on controls, material-handling equipment and traffic lanes help reduce accidents.

• **All of these benefits** of COLOR DYNAMICS cost no more than ordinary maintenance painting. Why not let us give you full details?

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New Binks Dispo Spray Booth has...

2250 sq. ft. of disposable "filters"

automatic curtain rolls away paint overspray

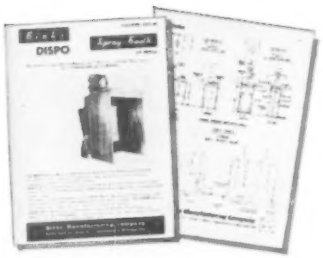
The secret of the new Binks Dispo Spray Booth is a 150-yard disposable curtain which collects paint overspray . . . approximately 150 gallons...that's 2250 sq. ft. of filtering!

It's economical . . . a roll costs less than 2 cents per square foot...about 80% less than most paint filters cost.

It's safe...manufactured to meet NFPA fire standards...accepted by all major insuring companies.

It's automatic . . . when the curtain collects a pre-determined amount of overspray, a new section advances automatically.

It's simple...one man can change a roll in 5 minutes.



Ask for Bulletins A-27-14 & 15 for complete details. Your Binks Distributor has copies, or write to the address below.

Ask about our spray painting school. Open to all . . . NO TUITION . . . covers all phases.

Binks Manufacturing Company 3146 Carroll Avenue, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

1237

Binks Everything for spray painting

Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

112—Fractional hp. reducer, with 25:1 gear ratio, transmits up to 0.95 hp. at 85 rpm. "Torque Arm" automatically adjusts V-belt drive to proper center distance. Mounts on 1¼-in. shaft; special size for 1 3/16-in. shafts. Overload release optional. *Dodge Mfg. Co.*

113—Fluorescent tube sleeve filters out ultraviolet rays while passing 90% of visible light. Eliminates fading, degradation and deteriorating of fabrics, plastics and metal paint finishes. Filtersleeve is made of clear plastic film. *Infropake Corp. of America.*

114—Saber belt sander (9 lb.) permits operator to reach inside edges previously accessible only with small grinders and sanders. Operates at 6200 fpm. with governed motor. Uses 1- to 2-in.-wide belt on 2-in.-diameter pulley. Has belt tracking adjustment. *Rotor Tool Co.*

Turn the page

with a Motorola Radio Paging System . . .

Your maintenance men are always within the sound of your voice!

MOTOROLA RADIO PAGING ASSURES PROMPT, PRIVATE CONTACT ANYWHERE IN AND AROUND YOUR PLANT

Now you can "pinpoint" your key men ...reach them instantly and privately anywhere on the job. Each of your key men wears a tiny, pocket-size radio receiver. To contact the man you want, you dial his paging number on your telephone and talk...or have your message relayed to him from a central point. An alerting tone sounds in his Pager...commands his immediate attention. He presses a button and receives your complete voice message.

HERE'S WHERE RADIO PAGING REALLY SAVES TIME AND MONEY...

Industrial Maintenance...When production equipment breaks down, the right man is called immediately—no time-consuming track-downs; down-time is held to a minimum.

Plant Security...Detectives and patrolmen are notified instantly—privately—whenever needed. Management gets an extra measure of protection for goods and facilities.

Combinations tailored to your specific needs...Motorola Radio Paging is flexible...adaptable to any plant, large or small.

SEND US THE COUPON...We'll give you information and suggestions matched to your specific operations.

MOTOROLA
RADIO PAGER

Motorola Communications & Electronics, Inc.
4501 Augusta Blvd., Chicago 51, Illinois
A Subsidiary of Motorola Inc., Dept. AFT 131

☐ Mail me full facts on Radio Pager ☐ Have representative call for appointment

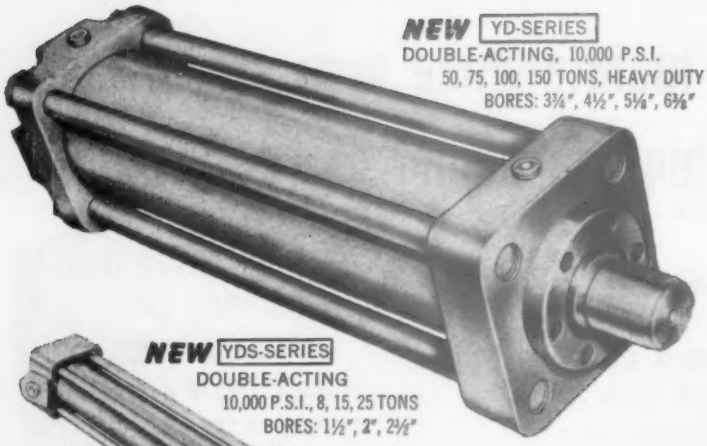
Name_____ Title_____

Company_____

Address_____ Phone_____

City_____ Zone_____ State_____

For more facts Circle 454 on Reader Service Card

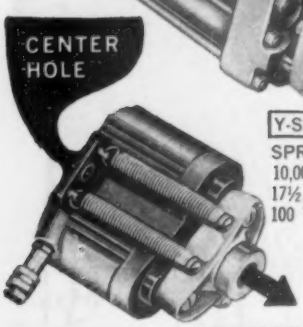


New OTC 10,000 p.s.i. Hydraulic Cylinders

- PRECISION BUILT, POWERFUL, COMPACT, LIGHTWEIGHT
- THE FIRST ADVANCES FROM OTC'S NEWLY FORMED "PRECISION HYDRAULICS DIVISION"

OTC 10,000 P.S.I. hydraulic cylinders open new possibilities in "hi-pressure" designing by meeting high force requirements with compact, lightweight components. Cylinders are precision built for dependable, continuous performance. Choice of stroke length and standard or tie-rod extension mountings for YD, YDS and YDT series cylinders. Requests for quotations invited.

New two-stage and single-stage 10,000 P.S.I. hydraulic pumps and power packages also available.



WRITE FOR FREE ENGINEERING DATA FILE CATALOG

PRECISION HYDRAULICS DIVISION
OWATONNA TOOL CO.
399 Cedar St. • Owatonna, Minn. • Cable: TOOLCO

Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

115—Live roller conveyor allows cartons and crushable commodities to accumulate without jackknifing. In pile-up, exerts only 3½% pressure of commodity weight. Handles cartons of various sizes and weights. Operates on low power. *Standard Conveyor Co.*

116—Time switch does work now requiring two or more reset timers. For use where operations from one second to several minutes may be needed every hour, every few hours, or every few days. Can be set to skip days. In second or minute increments. *Tork Time Controls, Inc.*

117—Switchboard instrument line, low-priced, features taut-band suspension. No pivots; no friction or wear. Vibration- and shock-resistant. Includes 4½-in.-sq. a-c and d-c ammeters, voltmeters, wattmeters, varmeters, frequency meters. *Westinghouse Electric Corp.*

Turn to page 114

The 121,000-sq.-ft. Motor Wheel Corporation building at LaGrange, Indiana, is a well designed production tool and a real asset to the community. In addition to colorful, low-profile beauty, such features as overhead offices and storage to save floor space, plenty of room for overhead equipment attached directly to the steel framing, and custom-designed facilities for shipping and receiving were specially incorporated to meet Motor Wheel's particular needs.

Custom-Designed for Manufacturing Efficiency

Versatile Stran-Steel buildings are custom-designed to meet your individual manufacturing needs perfectly. They make maximum use of mass produced pre-engineered steel components to keep costs down, quality up. The 1,400 building sizes available meet *any* design requirement, fit *any* floor plan, blend with *any* collateral material, and are so versatile, you'll *always* be able to meet increasing business requirements! What's more, these pre-engineered buildings are erected in much less time than ordinary construction. And every one is available in your choice of 10 distinctive factory-applied color-coatings for attractive and durable protection that's practically maintenance free!

Why not learn more about what Stran-Steel has to offer? You'll be especially interested in our exclusive "Building Proposal Service" and specialized finance plan. Simply mail the coupon or give your Stran-Steel dealer a call. He's in the Yellow Pages under STEEL BUILDINGS *or* BUILDINGS, STEEL.

STRAN-STEEL

Buildings for Modern Business

CLIP COUPON AND MAIL TO STRAN-STEEL CORPORATION, DEPT. FY-30, DETROIT 29, MICHIGAN

Please send complete literature on Stran-Steel Buildings in Stran-Satin Color. I'm interested in a building approximately_____ ft. by _____ ft. to be used for_____

Name_____ Title_____

Company_____ Phone_____

Address_____ County_____

City_____ Zone_____ State_____

STRAN-STEEL IS A DIVISION OF **NATIONAL STEEL CORPORATION**

New IBM computer language...AUTOPROMT cuts milling time for this helicopter gearbox cover by 75%

AUTOPROMT (AUTOmatic PROgramming for Machine Tools) is a powerful new computer language designed to broaden the use of numerically-controlled machine tools.

AUTOPROMT, for the first time, lets an engineer *describe the surfaces* of the three-dimensional shape he wants milled, *rather than calculating every path* the tool must follow in order to machine the part.

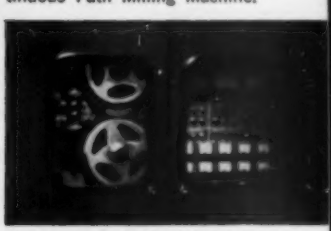
AUTOPROMT leaves to the computer the task of automatically generating these tool paths. You describe the part to be milled and the tool to be used in simple, *English-like*

Here's the way AUTOPROMT works at United Aircraft Corporation

The Parts Programmer, using a conventional blueprint, prepares 180 one-line statements in AUTOPROMT language.

The statements are punched into standard IBM cards and entered into the IBM 7090 Data Processing System. (AUTOPROMT also works with the 704 and 709 Systems).

The 7090, programmed with AUTOPROMT, produces 8000 tool path instructions needed to direct the Pratt and Whitney Co. Inc. Numeric-Keller Continuous Path Milling Machine.



Punched tapes direct the Numeric-Keller Milling Machine.

The Numeric-Keller mills the helicopter gearbox cover.

terms. The computer does the laborious calculating work.

AUTOPROMT produces results like these: the time to mill the gearbox shown in the photographs cut to *one-fourth* the machine time required by conventional methods. AUTOPROMT reduced the lead time from blueprint to production *from three months to two weeks.*

AUTOPROMT is available to IBM customers. Call your local IBM Representative for complete details on this latest advance in Numerical Control of machine tools.

IBM®
DATA PROCESSING

For more facts Circle 457 on Reader Service Card

Just off the plane and HERE COMES YOUR LUGGAGE

Turntables in incoming domestic flight area at Montreal International Air Terminal. The 80-foot perimeter of each slowly rotating luggage dispenser provides adequate space for passengers to identify and claim their luggage.

AN AIR TRAVELER'S DREAM COME TRUE!

You have just stepped off a plane with other jet-age travelers, and already an intricate system of belt conveyers, vertical hoists and turntables has been set in motion. The object—to get your luggage to you as quickly and as smoothly as possible—without confusion or delay. This is a good example of outstanding performance—the extra you get in Mathews Conveyers.

Write today for Bulletins U.A.L. 61—M.I.A. 561.

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GENERAL OFFICES . . . . . ELLWOOD CITY, PENNSYLVANIA
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MATHEWS

Over Fifty Years of Leadership in Mechanized Handling

Begins on page 100

EQUIPMENT NEWS

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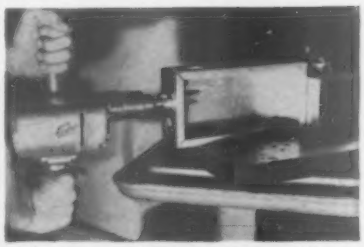


118—Cone drill produces ¼- to 1¼-in. diameter holes in metal, wood, plastic, or other thin material. There's no lost time in changing tool; no need to stock variety of drill sizes. Eliminates circular hack sawing or knockout punching in sheet metal work. *Scully-Jones & Co.*

119—Balance tester is computer which, when used with vibration analyzer, takes calculations out of balancing operations. For single- or two-plane balancing in production, or in-place balancing of rotating parts. Saves time. *International Research & Development Corp.*

120—Ultrasonic sealer quickly bonds Mylar, polyethylene, polypropylene, nylon and vinyl films, etc., with ultrasonic energy. Does not deform, distort, or change property of material. Needs no special training. Faster than chemical or heat processes. *Ultra Sonic Seal, Inc.*

121—Lightweight busway uses polyester supports for greater resistance against handling breakage and strain. High efficiency insulation prevents electrical creepage—safe to install and service. In 6- to 4000-amp. ratings. *Electric Distribution Products, Inc.*

Turn the page

This is AMERICAN OIL COMPANY

Our organization has more than 70 years' experience in the oil business. We are one of the largest petroleum organizations in America.

We believe the experienced American Oil representative who calls on you, plus the products and facilities which he has at his disposal, are reasons why you will like to do business with us.

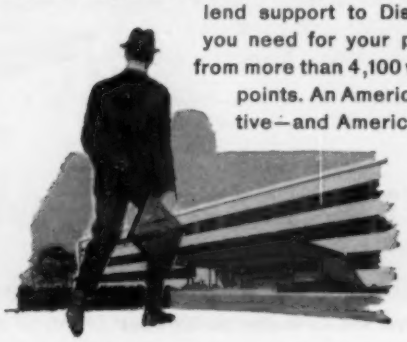
Your American Oil representative receives special training for his job at our Sales Engineering School. He is given concentrated basic instruction in all phases of petroleum product quality and application. According to a planned schedule, he returns for an advanced course and then again for post-graduate work.

In our Marketing Technical Service Department are specialists who are recognized authorities in their fields. These senior consultants may be called in to work with you on any specialized problem.

More than 1,000 research scientists and technicians are at work in our research laboratories developing new products and finding ways to improve present products. Their mission: To help your American Oil representative help you lower your maintenance costs and stretch your maintenance dollars.

Twelve American Oil refineries give flexibility to the production of petroleum products for industry. They help make it possible to assure prompt delivery. Upwards of 2,875 miles of product pipelines augment delivery facilities.

American Oil representatives operate from 74 District Offices. Thirteen Regional Offices strategically located throughout the country lend support to District Offices. The products you need for your plant or fleet are available from more than 4,100 warehouses and distribution points. An American Oil Company representative—and American Oil products—are only a telephone call from your office. We invite you to make that phone call. Or write **American Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.**



AMERICAN

AMERICAN OIL COMPANY

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a NEW CONCEPT in Narrow Aisle Equipment

E-X-T-E-N-D-I-N-G FORK
HIGH LIFT WALKIES

The unique design of these new Lewis-Shepard extending fork "walkie" Jackstackers® provides unlimited versatility in both narrow aisle and bulk storage operations. Highly maneuverable and easy-to-operate "walkie" trucks, they will give you these important handling features:

1. Eliminate load straddling.
2. Handle multi-width loads.
3. Service all types of racks.
4. "Fit" in trucks and trailers.
5. Eliminate space between loads.

PANTOGRAPH DESIGN

HYDRAFORK DESIGN

Hydrafork and pantograph models available in 2000 or 3000 lb. capacities. (Typical "trucks in action" shown here illustrate no-straddling and maximum bulk storage features.) *Exclusive* L-S "walkie" controls in handle for: extending and retracting forks beyond base arms; load lifting and lowering; 2 forward and reverse speeds; 3 braking systems. These new extending fork high lift "walkies" incorporate all L-S top-quality features.

Write today for Circulars SA-54-100 and SA-54-200, and "Trucks in Action" bulletins.

L-S LEWIS-SHEPARD®
158 Walnut Street — Watertown 72, Mass.
The MASTER® Line — The COMPLETE Line of Materials Handling Equipment

Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

122—Portable balancer checks rotating assemblies where vibrations must be isolated, measured, located and corrected. Can also be used as "built-in" monitoring device. Transistorized, compact. Sensitive to amplitudes down to 0.000025 in. *Gisholt Machine Co.*

123—Zirc-Ram frees frozen Zerk-type grease fittings with one hammer blow. Works on straight or angle fittings. Blows out all hardened matter unless bushing has been completely turned to close the opening. No harm to fittings; uses hydraulic pressure. *Owatonna Tool Co.*

124—Tote boxes for small-parts handling have snug-fitting transparent lids for visual inventory. Made of polyester resins and glass fiber for high strength and no maintenance. Nest and stack. Easily cleaned with water, steam, or detergents. *Molded Fiber Glass Tray Co.*

Turn the page

Where so much depends on so little

ROLLWAY Field Engineers can help solve thorny replacement bearing problems

When production grinds to a halt due to roller bearing failure – in *any* machine or equipment – call in your Rollway Bearing Field Engineering Representative. He is available through your nearest Authorized Rollway Distributor.

Every Rollway Field Engineer is a bearing specialist, fully qualified to make recommendations on the spot. You will find he knows his business, *and yours*, when it comes to cylindrical roller bearings.

After his analysis of your particular problem, you can ordinarily get whatever replacement bearing is needed, right from the Rollway Distributor's stock. Your machines start rolling again. A minimum of delay . . . a maximum of service.

• *Ask your bearing distributor man for a copy of the Rollway product line bulletin. Rollway Bearing Co., Inc., Syracuse, N. Y.*

You can depend on

ROLLWAY®

BEARINGS

ENGINEERING OFFICES:

Syracuse • Boston • Chicago • Detroit • Toronto
Pittsburgh • Cleveland • Seattle • Houston
Philadelphia • Los Angeles • San Francisco

For more facts Circle 461 on Reader Service Card

9,143,000 acres under fire protection in KENTUCKY!

NO other State offers industry such tremendous natural advantages as Kentucky. But that's only *half* of the Kentucky story. In January, 1960, Governor Combs and Lt. Governor Wyatt announced a multi-faceted program to help develop Kentucky's enormous resources. *Today, every one of these projected activities has actually been launched.*

Forestry, for instance. This year, Kentucky will have more than nine million acres of forest land under fire protection —80% of its total forests! Before the end of the year twenty-two steel fire-detection towers will be added to the twenty-eight already constructed in 1961, bringing the total to 166 . . . twenty-three new graduate foresters have increased to 56 the number of professionals now working with Kentucky's private timberland owners . . . a second forest tree nursery, established in 1960, will bring the State's 1962 planting stock inventory to thirty million seedlings, with full capacity of forty million . . . 170 fire-prevention meetings have been held at the "grass-roots" level, reaching more than 10,000 people. A new Division of Wood Utilization has been established to serve manufacturers of wood products.

These are just a few of the big things now happening in Kentucky! We would like to give you complete details on the *unusual competitive advantages Kentucky can offer your company*. Write: Lt. Gov. Wilson W. Wyatt, or E. B. Kennedy, Commissioner, Dept. of Economic Development, 500 State Capitol Bldg., Frankfort, Ky.

And Kentucky offers much more than forestry advantages...

LOCATION–68.4% of Nation's population within 500 mi., 38.1% within 300 mi., 21% within 200 mi.

FINANCING PLANS – more industrial financing plans (five) than any other State in the Nation.

TRANSPORTATION FACILITIES – served by 4,000 mi. of track, 20,000 mi. of State-maintained highways, more miles of navigable rivers than any other State, seven major airlines.

POWER CAPACITY – sufficient public and private reserve capacity readily available to supply the needs of any new or expanding industry.

WATER RESOURCES – Kentucky has adequate ground and surface water to fulfill *all* present and future needs.

LABOR FORCE – survey of Kentucky's 1,000 largest manufacturers shows 94% consider their labor productivity from average to very high.

COAL RESERVES – third-largest bituminous coal-producing State with two large, widely separated fields.

NATURAL GAS – more than 90 of Kentucky's 120 counties have natural gas.

RAW MATERIALS – *Natural:* coal, natural gas, oil, limestone, silica sand, fluorspar, ball and fire clay, timber. *Manufactured:* chemicals, metals, plastics, coke, synthetic rubber, to name only a few.

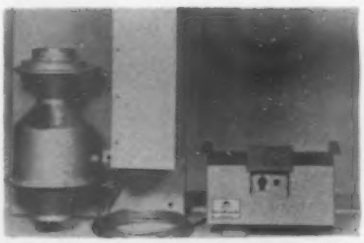
RESEARCH FACILITIES – New Spindletop research facility is a three-way partnership: the State, University of Kentucky and private industry.

COMMONWEALTH OF
KENTUCKY
WHERE BIG THINGS ARE HAPPENING

Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

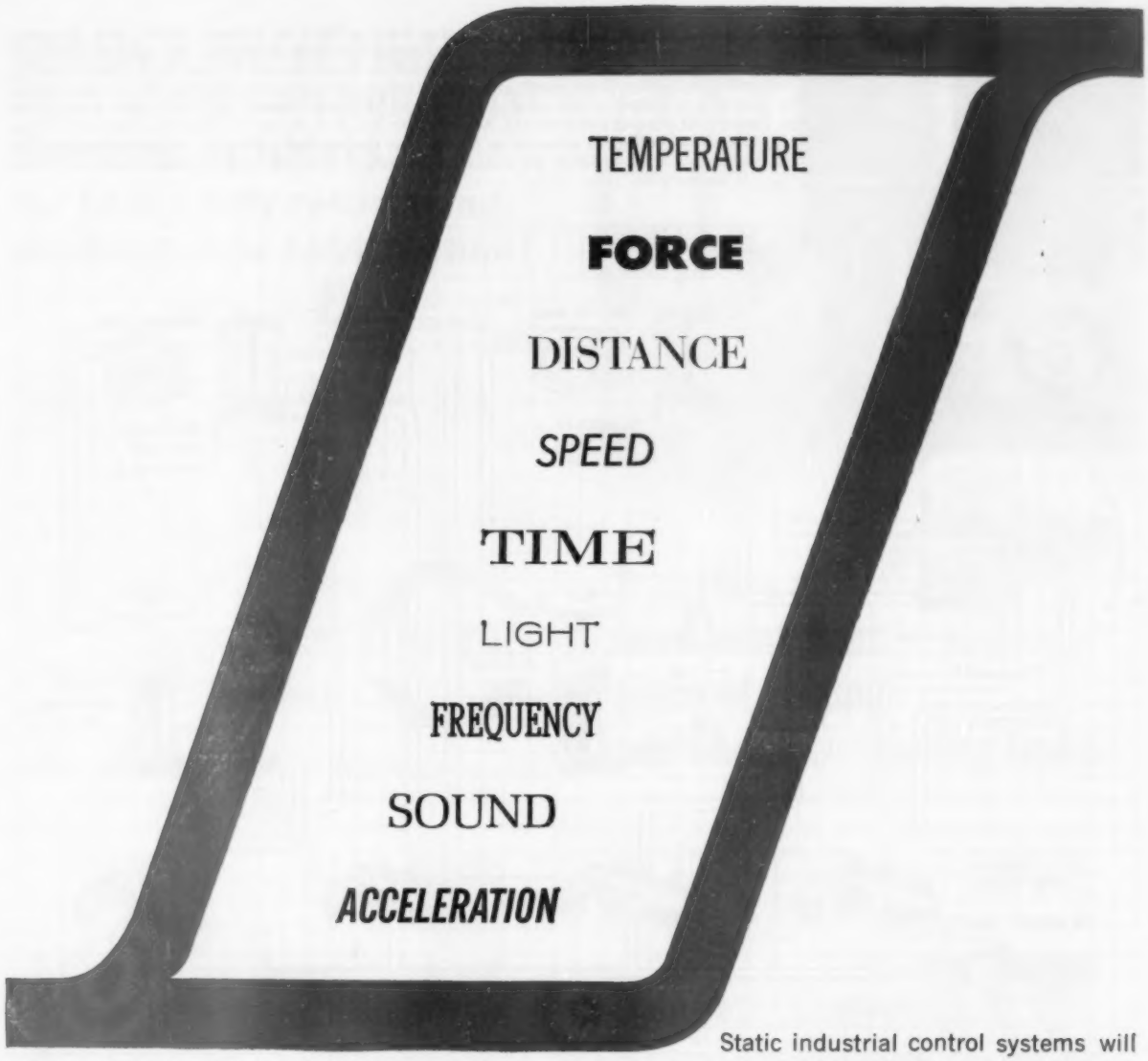


125—Dry flowmeter measures flow as low as 5 lb./min. by weight. Only one moving part—an air bearing with no metal-to-metal contact—minimizes maintenance. For read-out, flow pressure is changed to electrical current through electronic unit. *Industrial Powertronix, Inc.*

126—Accupressure system replaces roof tanks or basement pressure tanks. Maintains constant water pressure within 1½ to 2%. Package consists of centrifugal pump, motor, fluid drive, and control. In 3 to 200 hp., 50 to 5000 gpm. *Allis-Chalmers Mfg. Co.*

127—Moving stairway, for installation in plants, carries personnel quickly and safely between floors. Autostair reverses, thus eliminating separate up and down units. Runs only when needed by rider. Comes preassembled; costs little to install. *Autostair Sales.*

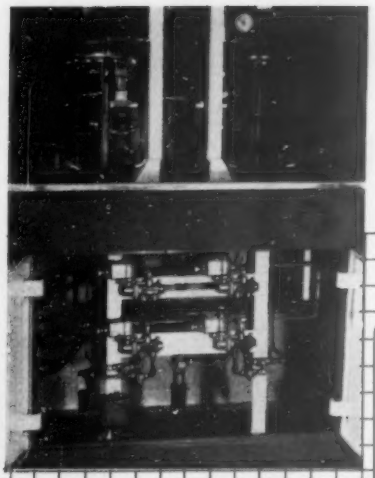
Turn to page 122



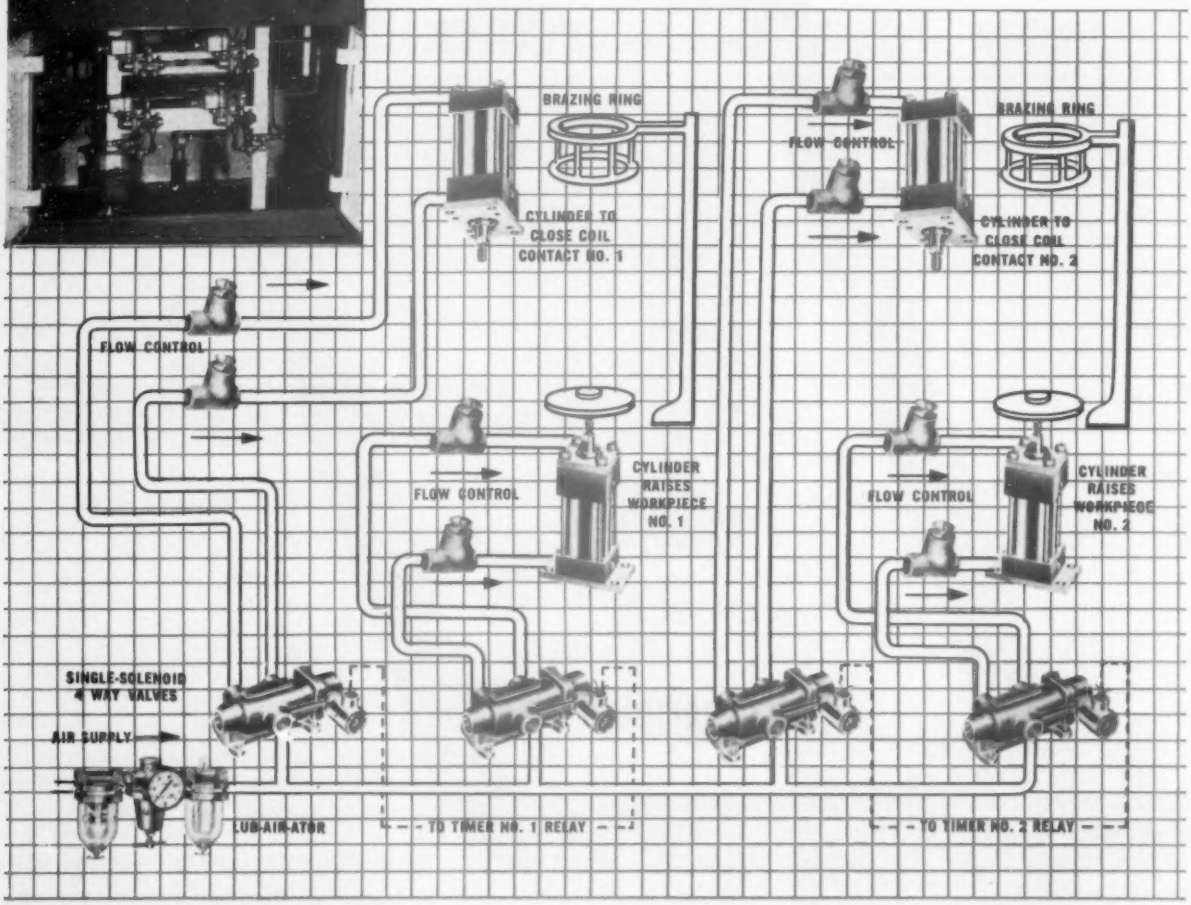
Static industrial control systems will regulate virtually anything that is controllable — and under normal operation these *magnetic* systems will never break down, wear out or need servicing. Temperature (with precision to ±1/4°F at 2200°), position (with logic involving *and, or, not, memory* and *time delay*), speed, force, light, sound, acceleration, frequency, distance, field strength and pressure are but a few. ■ One manufacturer has replaced a vacuum tube-mechanical relay system on his high-speed assembly lines. Reason: it broke down every three weeks. The replacement magnetic static control system has now gone through 26,000,000 consecutive cycles without fault. ■ The symbol above, the magnetic hysteresis loop, , may encompass some of your control problems which are solvable at a lower overall cost. May we discuss this with you? Magnetics Inc., Department F-93, Butler, Pennsylvania.

INDUSTRIAL CONTROL EQUIPMENT

MAGNETICS inc.®



General Electric Company's Apparatus Service Shop in Detroit, Mich., uses Schrader air circuits to actuate and control this brazing machine. It enables one man to braze 120 planet carrier gear assemblies for automotive transmissions in one hour. Double-acting cylinders, actuated by solenoid valves, lift the assembly into position within the coil for brazing the shaft to the gear, and lower it for water quench. JIC cylinders control the induction heating coil contacts. According to Frank A. Ross, the designer, Schrader's Flow Control Valves close contacts so gently that they perform 750,000 cycles before needing replacement. In addition, air works successfully in a strong magnetic field, and the circuits can be simple.



TOUGH BRAZING JOB BECOMES A BREEZE... WITH SCHRADER AIR CIRCUITRY

PROBLEM: Strong magnetic field . . . complex movement of parts . . . speed requirements . . . precise actuation of coil contacts.
SOLUTION: Simple Schrader air control of mass production operations.
Schrader Air Products are designed to operate together in varied combinations to produce practically unlimited results. Their quality and versatility make them capable of *simplifying* production . . . while speeding it up . . . at unmatched low cost. Are you failing to ultilize fully the air you already have? Follow this Detroit plant's example. Examine your production facilities with air in mind. Make many operations simpler and more efficient by applying any or all of the complete line of Schrader Air Control Products.

FULL LINE OF QUALITY AIR CIRCUIT COMPONENTS • OFF-THE-SHELF SERVICE AND INFORMATION FROM YOUR NEARBY DISTRIBUTOR • STAFFED WITH AIR CIRCUIT EXPERTS • CONSULT YELLOW PAGES OR WRITE FOR HIS ADDRESS

Schrader®
a division of SCOVILL

A. SCHRADER'S SON
Division of Scovill Manufacturing Co., Inc.
457 Vanderbilt Ave., Brooklyn 38, N. Y.

QUALITY AIR CONTROL PRODUCTS

For more facts Circle 464 on Reader Service Card

FACTORY

Obtain a file of Flintkote data sheets on industrial flooring products

for heavy duty resurfacing, patching, new construction!

FOR NEW CONSTRUCTION AND RESURFACING: Cold-Laid Asphalt Mastic provides a non-slippery, dustless, insulating and comfortable, tough, shockproof wearing surface.

Flintkote Latex Flooring has high strength and toughness without brittleness. Unequaled in economical durability for topping worn floor surfaces. Trowel applied.

FOR SMALL PATCH WORK: Flintkote Latex Concrete Patch is a two component unit in a single package. Provides a tight, non-shrinking bond to virtually all surfaces. Trowel applied.

FOR PROBLEM FLOORS: Flintkote Epoxy Flooring has great resistance to solvents, oils, greases, acids, alkaline solutions, alcohols, shock and abrasive wear.

FLINTKOTE®

Write to: The Flintkote Company, Industrial Division, 30 Rockefeller Plaza, New York 20, N. Y.

America's Broadest Line of Building Products

For more facts Circle 465 on Reader Service Card

Arno® STRAPPING TAPE saves BUNDLING TIME

The fast, easy way to bundle for shipping or handling. Arno Strapping Tape is quick to apply, simple to remove—yet holds securely. High tensile strength (210 lbs./inch width) of the rayon reinforcement and strong adhesion of the pressure-sensitive adhesive also make this tape a time-saver for packaging and palletizing.

WRITE FOR FREE TEST SAMPLE

Manufacturers Agents Wanted for Some Selected Areas

Arno® ADHESIVE TAPES, INC.

Dr. Scholl's Adhesive Tape Division

5207 OHIO STREET, MICHIGAN CITY, INDIANA

For more facts Circle 466 on Reader Service Card

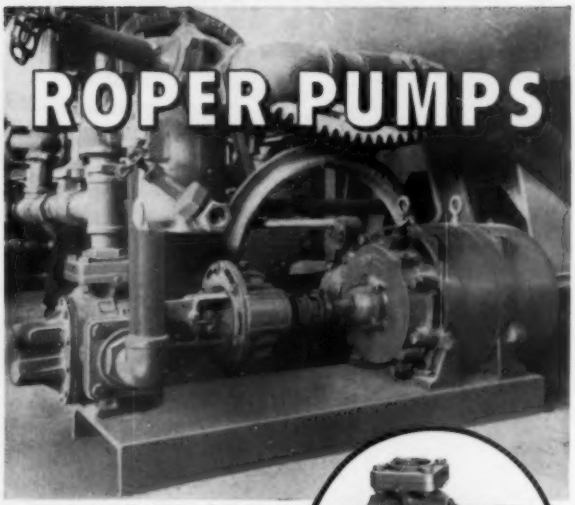


photo courtesy The Glidden Company

transfers mill base paint from pigment-mixing pebble mill to thinning tanks

OUTPUT CAPACITY: 40-300 GPM • PRESSURES TO 100 PSI

In the first stage of paint manufacturing, newly mixed raw pigments move from pebble mill to thinning tanks. The blended material has a viscosity of about 500 SSU, and is kept moving constantly. The pump used is a Roper Series 3600, operating at 445 rpm and producing up to about 100 gpm. Pump is powered by 5 hp, 1160 rpm motor. Viscosity and production requirements make the Roper Series 3600 the ideal pump for this job. With this positive displacement pump, production is pulsation-free, despite uneven discharge pressure or viscosities, because of its perfectly balanced construction. Face plate relief valve allows pressure adjustment over entire psi range, and permits temporary stoppage of flow without halting pump.

Built for Trouble-free Production

- Two helical pumping gears . . . six-toothed, equal sized . . . keyed to shafts with sliding fit for quiet operation.
- Steel shafts . . . precision-ground . . . induction-hardened at bearing and packing surfaces.
- Bearings . . . four high-lead bronze or chrome-iron bearings support pumping gears . . . hardened for long, efficient service
- Fully enclosed gear reduction with anti-friction bearings . . . three gear ratios, each is interchangeable
- High suction lift capacity . . . 15 ft. at 60 psi

For full information, contact your Roper dealer

Send for "How To Solve Pumping Problems" booklet

ROPER HYDRAULICS, INC.

Dependable pumps since 1857

COMMERCE, GEORGIA

For more facts Circle 467 on Reader Service Card

Facts of Light!

IT COSTS NEARLY $2.50 TO OPERATE A 25 CENT LAMP

The electric power required to operate a 25 cent 100 watt incandescent lamp will amount to nearly $2.50 before the lamp burns out. The efficiency with which a lamp converts electric power into usable light is an important factor in considering lamp value.

TWO 100's WON'T DO THE WORK OF ONE 200

A 200 watt incandescent lamp produces approximately 3800 lumens. Two 100 watt incandescent lamps produce approximately 3400 lumens — about 10% less light.

YOU CAN CHECK YOUR LIGHTING AGAINST RECOMMENDED LEVELS FOR ALMOST 700 DIFFERENT JOBS

The Illuminating Engineering Society publishes Foot-candle Tables of Recommended Illumination (1958) for seeing tasks in many different categories and industries.

THERE ARE OVER 3,000 TYPES AND SIZES OF CHAMPION LAMPS

More than 3,000 different Champion Lamps are available to satisfy the diversified lighting needs in office buildings, homes, department stores, ball fields, theaters, factories, shops, garages, showrooms, railroads, airports, restaurants, streets, parks, schools, and many other installations.

Your Best Buy in Lamps

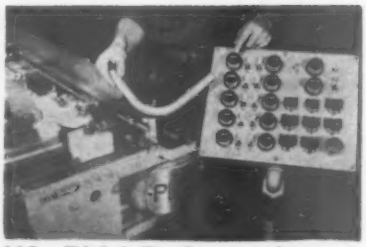
CHAMPION LAMP WORKS, Lynn, Massachusetts

CHAMPION INCANDESCENT-FLUORESCENT

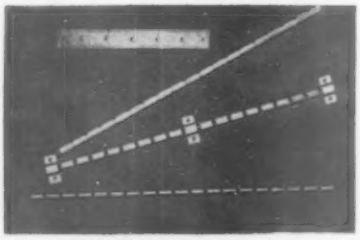
Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.



128—Dial-A-Bend permits untrained operator to program the bend of angles from blueprint specifications or records from previous set-ups. Up to 15 angles can be dialed in sequence. Dial graduated in increments of one-tenth of one degree. *Pines Engineering Co.*



129—Strip-Damper is low-cost, easy-to-install vibration damping device. Weighs under 1½ oz.; comes in 11¾-in. strips. Operates in −80 to +350 F. temperatures; resists moisture, fungus, oil, solvents. Can be attached with clips or epoxy glue. *Barry Wright Corp.*

130—Sealed dry-type transformer uses C_3F_8 as insulating-cooling medium. Compared with nitrogen unit: impulse levels higher, size smaller, price comparable, about 30% lighter. From 300 kva. and up to 15 kv. Operates at 150 C. average rise. *General Electric Co.*

Turn the page

Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

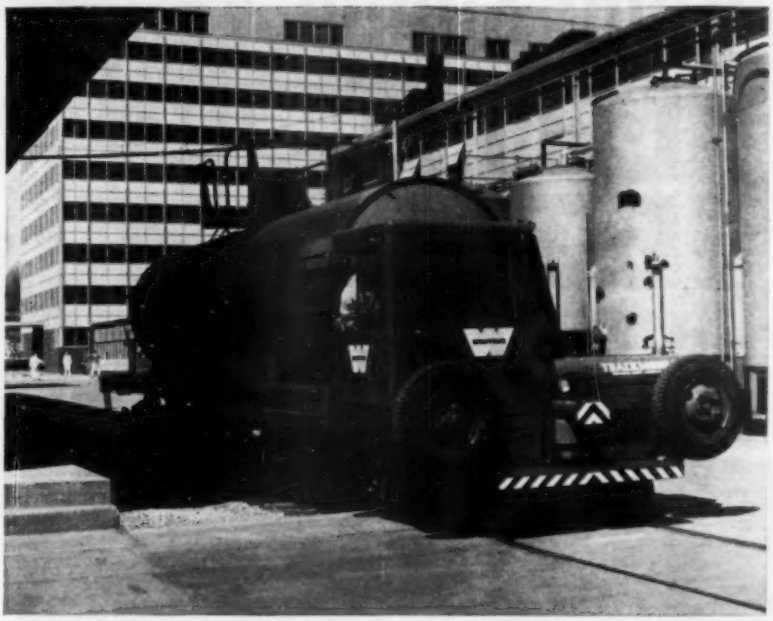
131—Rotary connector, for drop-cords to portable tools and rotating devices, permits power feed without entangling, twisting, or fraying cord. Eliminates short circuits. Turns in either direction to 1000 rpm., or for oscillation. *Frankel Engineering Laboratories, Inc.*

132—Silicon-controlled rectifier eliminates use of small SCRs in parallel for high-power applications. Rated 25 amp. at 100 C. (maximum d-c current of 35 amp. at 95 C.). Voltage ratings from 40 to 400 v. for use in power supplies, inverters. *Texas Instruments, Inc.*

133—Box marker automatically registers and accurately imprints lid ends of filled or empty assembled boxes. Handles cartons (sizes to 8x8¼x15⅝-in.) at up to 65-per-min. rate. Changes over from one size to another in minutes. Has built-in counter. *Markem Machine Co.*

Turn the page

IN THE MANUFACTURING INDUSTRIES...



The lesson in this photo can save your company thousands of dollars

What's happening here? A Trackmobile is pushing a loaded tank car—a Trackmobile! Yes sir. A Trackmobile is Whiting's answer to low cost movement of rail cars in and around your plant. This vehicle switches, spots, pushes and pulls rail cars. It has an auxiliary set of road wheels. They are hydraulically lowered quickly so that the Trackmobile can run across tracks to any out-of-the-way spot for the next job. It parks anywhere.

For years, Trackmobile has been saving money for plants in your industry. They'll do your job, too—efficiently and unnoticed—unnoticed, that is, except on your profit and loss statement.

Please challenge us to show proof that a Trackmobile can save you money. Write Whiting Corporation, 15689 Lathrop Ave., Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.

It runs on wheels It runs on rails It switches, spots and hauls

FREE: Write for color booklet "Tricky the Trackmobile"

90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

TRACKMOBILE®

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL PROCESSING EQUIPMENT

For more facts Circle 469 on Reader Service Card

good sound value

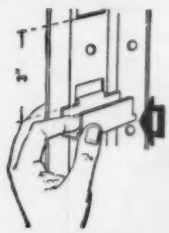
BORROUGHS STEEL SHELVING

an extra good buy

send for catalog

Represented in Sweet's Catalog, Plant Engineering File 4G BO

this feature alone should swing you to Borroughs!



Insert 4 shelf support brackets with finger-tip ease — no fumbling with studs, bolts, nuts or lock washers.

Tilt shelf into support brackets with the greatest of ease—shelf is ready for loading.

The most simple, most flexible, most rapidly assembled shelving on the market today . . . that's a fact that's known the nation over. And these Borroughs facts are outstanding too . . . entire units can be assembled without special tools — shelves are adjustable without nuts or bolts — every unit is complete in itself. Send for more solid facts today!

BORROUGHS MANUFACTURING COMPANY
OF KALAMAZOO
A SUBSIDIARY OF THE AMERICAN METAL PRODUCTS COMPANY OF DETROIT
3020 NORTH-BURDICK ST. amp KALAMAZOO, MICHIGAN

Begins on page 100

EQUIPMENT NEWS

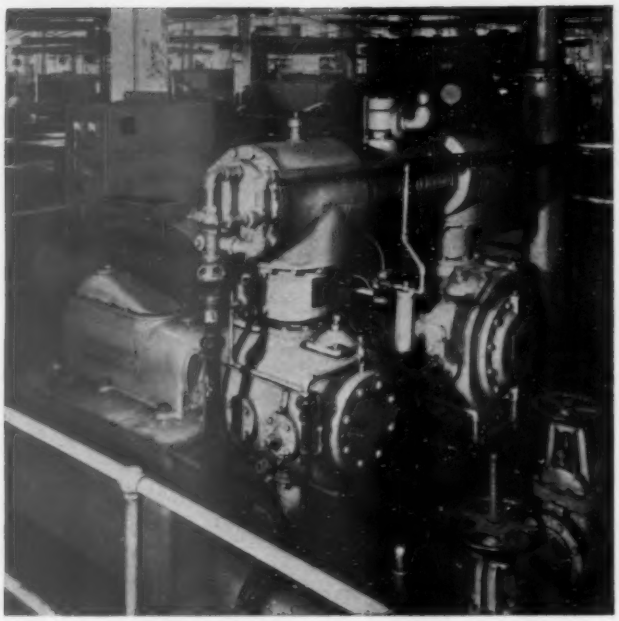
For more data, circle item numbers you want on Reader Service Card.

134—Waste receptacle liner, made of plastic, comes in wide range of sizes. Sanitary, easy to clean. Resists corrosion from colas, syrups, sugar drinks, water, soap, acids. It's non-rusting, lightweight. Has no dirt-catching corners and seams. *Rubbermaid Corp.*

135—Low-voltage capacitors for power factor correction are smaller and lighter than previous standard models. Come in 5 to 25 kvar. at 460 and 575 v., and 2½ to 15 kvar. at 230 v. Latch cover can be sealed to simplify inspection of fuses. *General Electric Co.*

136—Ultrasonic degreaser uses Freon solvent for cleaning plastics, metals, elastomers, or insulations affected by chlorinated solvents. Two-stage operation—from cleaning chamber to vapor area for rinsing and drying. In 1- or 2-gal. sizes. *National Ultrasonic Corp.*

Turn to page 128



IN I-R COMPRESSORS,
TIME TELLS
THE DIFFERENCE

In this compressor, I-R Channel Valves have operated

13 YEARS

without maintenance or cleaning!

The 125-hp Ingersoll-Rand compressor shown above was installed in 1948 at the American Standard Industrial Division of American Radiator and Standard Sanitary Corporation, to provide 100-psi plant air power. Since that time, the compressor has operated from 12 to 24 hours a day, five or six days a week – and not a single valve part has been replaced, and the *valves never even had to be cleaned!* A couple of years ago the operator removed one valve from the machine for inspection, found it in perfect condition, and put it right back into the cylinder!

Ingersoll-Rand air-cushioned Channel Valves* have made many records like this. Ingersoll-Rand compressors now have many other *extra-value features*, such as full-floating aluminum bearings which never need adjustment, sealed frame which keeps out dirt (the major cause of wear), full filtered pressure lubrication, and self-adjusting metallic packing.

The extra value that's built into every type of Ingersoll-Rand compressor pays off with *long-run economy*. Reduced maintenance and attention, over many years, mean big savings in the cost of air power. I-R offers the most complete line of compressors—in reciprocating, centrifugal, axial-flow, rotary and thermal types. There are units from ½ to 25,000 hp, for pressures from one micron to 125,000 psi. Call your I-R man today for help on your job.

***Only I-R compressors have Channel Valves**
Known for high efficiency, quiet operation and exceptional durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and bowed leaf springs, with trapped-air spaces which cushion action, prevent impact. Separate stainless-steel seat plate may be turned over or replaced for new life.

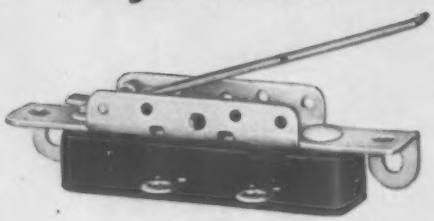
Ingersoll-Rand
254A1 ♥ 11 Broadway, New York 4, N.Y.

The World's Most Comprehensive Compressor Experience

BASIC for Purchasing Agents

Purchasing agents searching for a single source for a wide variety of products are sure to find the value of these American-Standard Controls Division products. This is true of anyone who must control or indicate the pressure or temperature of gases and fluids or electrical energy.

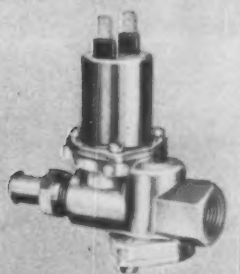
TyniSwitch



Here is a precision miniature snap switch available with a wide variety of actuators which will shave space, yet perform dependably hundreds of thousands of times. It makes and breaks positively *without bounce!* Ratings up to 15 amperes.

AMERICAN-Standard
CONTROLS DIVISION

Solenoid Valves

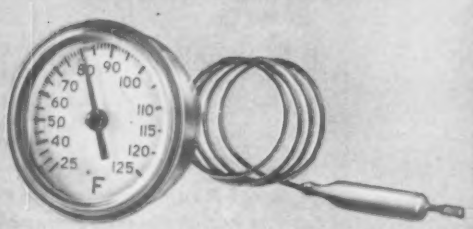


Widely used in the appliance and vending machine industry, these valves have the ability to provide a predetermined liquid flow without regard to pressure. Brass, stainless steel or nylon bodies. Wide selection of mounting brackets, line connections and electrical specifications.

AMERICAN-Standard
CONTROLS DIVISION

You can get detailed information on any of these products by writing American-Standard Controls Division, 5900 Trumbull, Detroit 8, Michigan.

Remote Reading Thermometers

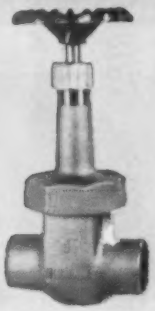


There are practically no limits as to the specialized applications for Rochester thermometers. This remote reading thermometer is hermetically sealed, can be externally recalibrated, is available in a wide variety of ranges and capillary tube lengths.

AMERICAN-Standard
CONTROLS DIVISION

AMERICAN-Standard
CONTROLS DIVISION

D. T. Williams Valves



D. T. Williams value valves are bronze for superior corrosion resistance. For many years they have been called "Guardians of the Pipelines"; available in gate, globe, hose, angle, check and quick-opening models, with a variety of seat types and materials.

AMERICAN-Standard
CONTROLS DIVISION

Pressure Gauges

Rochester pressure gauges have a multi-wound helical coil and are unmatched for extensive cycling and continued accuracy under extreme conditions. Friction and hysteresis is below readable limits. Available in 2″, 3″ and 5″ dials. Ranges to 10,000 psi.

AMERICAN-Standard
CONTROLS DIVISION

Industrial Thermometers

Rochester bimetal industrial dial thermometers provide extreme accuracy, are hermetically sealed and can be externally calibrated. Available in standard dial sizes from 1″ to 5″, and with scale ranges from minus 150°F to 1000°F.

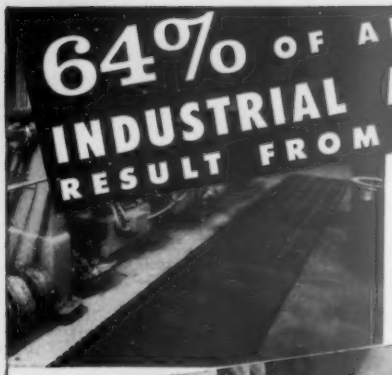
AMERICAN-Standard
CONTROLS DIVISION

Pressure, Temperature Controls

ASCD makes a wide variety of heavy duty controls for either pressure or temperature applications. They are extraordinarily rugged, can be designed to meet almost any condition.

AMERICAN-Standard
CONTROLS DIVISION

64% OF ALL INDUSTRIAL ACCIDENTS RESULT FROM SLIPPING



PREVENT THEM WITH—

NYRACORD COUNTER-TRED, TRAFFIC-TRED or TUF-TRED

Eliminates the hazards of sloppy, slippery floors in locker rooms, showers and restrooms, at drinking fountains, and on ramps and loading docks.

Resilient, they provide comfort underfoot, retard fatigue, and keep feet off of cold damp floors. The ribbed bottom side of Counter-Tred and Traffic-Tred affords aeration and drainage. Both are also available in oil and grease-resistant type for use around machinery. Tuf-Tred, when used at the entrance, traps the dirt at the door, prevents tracking throughout the building. All of them reduce product breakage and afford unequaled resistance to wear.

Available in a variety of widths they roll up for easy cleaning.

Send for catalog sheets and prices.

AMERICAN MAT CORPORATION

1745 ADAMS STREET • TOLEDO 2, OHIO

"America's Largest Specialists in Floor Matting"

A MAT FOR EVERY PURPOSE

For more facts Circle 473 on Reader Service Card

if you spend more than $100 per week for paint or other coatings, you should *find out about...*

NORDSON HOT AIRLESS SPRAY PAINTING

The Nordson Hot Airless System can save you up to 30% on paint or other coating materials and on labor too! Less expensive spray booths and exhaust systems are needed. Clean up and housekeeping costs are reduced and at the same time finishing quality is improved.

Find out how Nordson Hot Airless can pay off for you, in savings and in improved quality. Write today!

NORDSON CORPORATION
37 Jackson St., Amherst, Ohio

Begins on page 100

EQUIPMENT NEWS

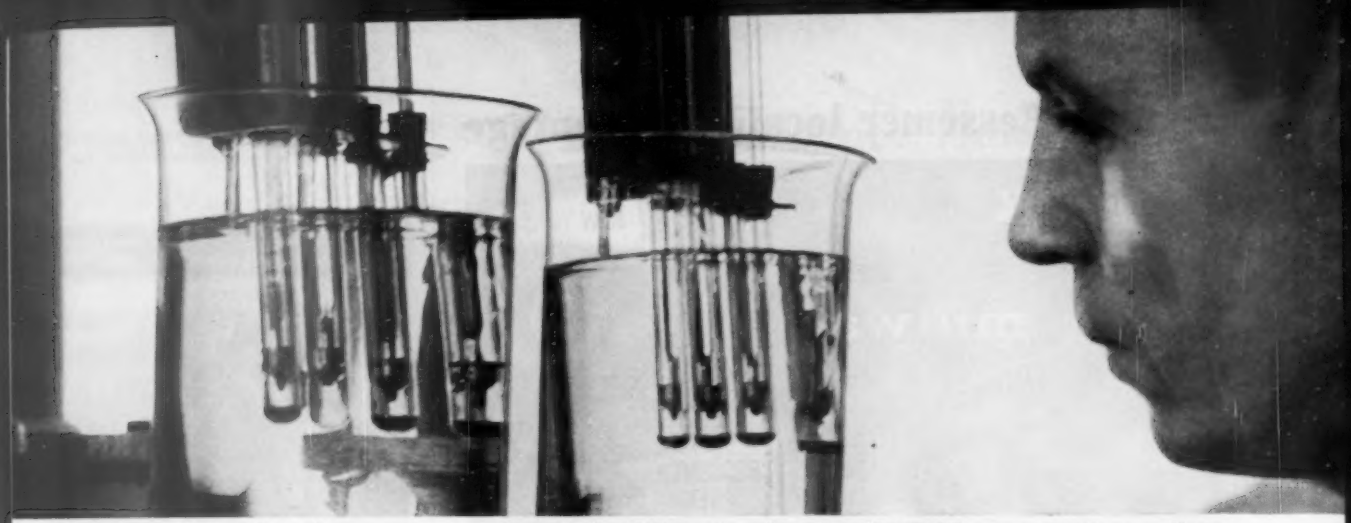
For more data, circle item numbers you want on Reader Service Card.

137—Turbine pump uses principle of pressure regeneration to develop high heads in single stage. Has no vapor binding. Replaceable casing plates eliminate need to restore entire casing. Operates at pressures to 150 psi. No need to align impeller. *Worthington Corp.*

138—A-C arc welder for intermittent use is lightweight (136 lb.), low cost ($158) and offers 225-amp. rating. Handles electrodes to $\frac{3}{16}$-in. diameter. Dial permits quick adjustment. Can be moved easily. Waterproof. Operates on 220 v., single phase. *Lincoln Electric Co.*

139—Portable bins for small parts eliminate set-up and knock-down time needed to move or store an entire assembly station. Can be used individually or slid into case (with see-through cover) for carrying. In 2, 3, 4 compartments. *Highland Products, Inc.*

Turn the page



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from let) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

*Registered Trademark

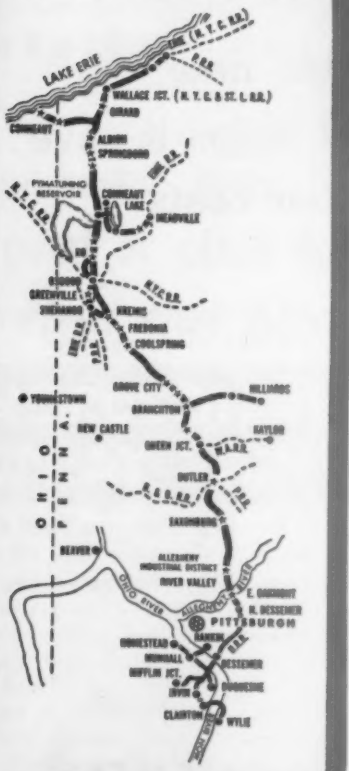
SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry

For more facts Circle 475 on Reader Service Card

another Bessemer location advantage

★ SUITABLE SITES



The Bessemer Area is one of the world's greatest industrial markets with a $5-billion primary and fabricated metal output. Reach out 125 miles—and you tap a lucrative market of over 8 million consumers.

Other Bessemer Area advantages are: 24-hour delivery of steel and other basic materials; extensive deposits of coal, limestone, clay and aggregates; a labor force of over a million widely diversified as to skill; choice of unexcelled, adaptable, flood-free sites served by abundant water, gas and power.

Investigate today! Write or phone for location factors on any of the suitable plant sites indicated by stars on the map. No obligation. Strictly confidential.

BESSEMER and LAKE ERIE RAILROAD CO.

INDUSTRIAL DEVELOPMENT DEPARTMENT

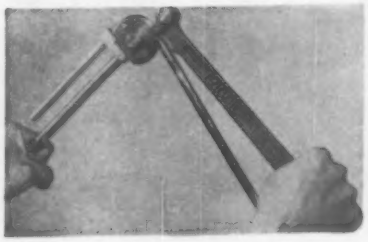
1828 FRICK BUILDING • PITTSBURGH 30, PA. • ATLANTIC 1-4780

The Bessemer Man is at your "Site Service"

Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.



140—Tubing benders are ideal for use in hard-to-reach areas or where tubing is already installed. For use with soft or hard copper, aluminum and some sizes of stainless steel and brass tubing. In 6 models for tubes of 3/16 to ½ in. O.D. Bends to 180°. *Ridge Tool Co.*

141—Lift trucks, 2000-lb. capacity, come in two series, the SpaceSaver 20 and 25. Small, but highly maneuverable, trucks are designed to reduce driver fatigue. Components for servicing are topside for easy reach. One pedal controls forward-reverse and throttle. *Hyster Co.*

142—Truck battery provides higher capacity of 85 amp./hr. per positive plate at 6-hr. rate, yet increases cell height less than 10%. Previous type provided 72 amp./hr. per plate. HY battery is 24¾ x 25¾ in. with cover, same as previous model. *Electric Autolite Co.*

143—Impact wrench is said to be lightest 2-in.-capacity air-operated type available. Rugged—withstands tough use such as in chemical processing and utilities. Has roll-type side throttle handle and dead handle; iron or aluminum housing. *Chicago Pneumatic Tool Co.*

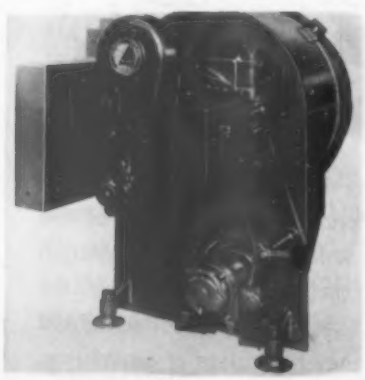
Begins on page 100

EQUIPMENT NEWS

For more data, circle item numbers you want on Reader Service Card.

144—Mobile spray cleaner uses water or germicidal sanitizing fluid to clean food-serving and storage equipment, locker rooms, rest rooms, floors, walls. Safer than steam; sanitizes faster and more effectively. Powered by motor-driven pump. *Lincoln Mfg. Co.*

145—Insulation testing megohmeter has d-c test potential adjustable from 0 to 2500 v. Permits prediction of insulation life. Measures from 100,000 ohms to 50,000 megohms. Self-contained electronic power supply—no hand crank. Portable. *Associated Research, Inc.*



146—Combustion system is compact, integrated package to convert high- or low-pressure boiler, oven, or dryer to automatic operation. For use where natural or induced draft is inadequate. Usable on firebox with up to ¾-in. water pressure. *Preferred Utilities Mfg. Corp.*

Easy-to-Move . . . Time-Saving Power for Your Shop or on the Job . . . New

RIDGID® 300 Power Drive

Bench, stand or truck mounted, this compact RIDGID 300 Power Drive quickly pays for itself in time and labor savings. Speed chuck closes and releases by hand . . . holds tight forward or reverse. Cam-action rear workholder holds even long lengths straight for perfect threads and cuts every time.

Converts to Low-Cost Threading Machine

Add the RIDGID No. 310 Carriage, No. 360 Cutter and a RIDGID Quick-Opening Machine Die Head, and you're ready to cut, thread and ream. With a No. 19 Nipple Chuck you even cut and thread close nipples with threading machine speed and ease.

DRIVES GEARED THREADERS • THREADS CLOSE NIPPLES

Call your Distributor today. For your convenience, he maintains a complete stock of RIDGID Work-Saver Pipe Tools and parts!

RIDGID

The Ridge Tool Company, Elyria, Ohio, U.S.A.

For more facts Circle 477 on Reader Service Card

Problem:

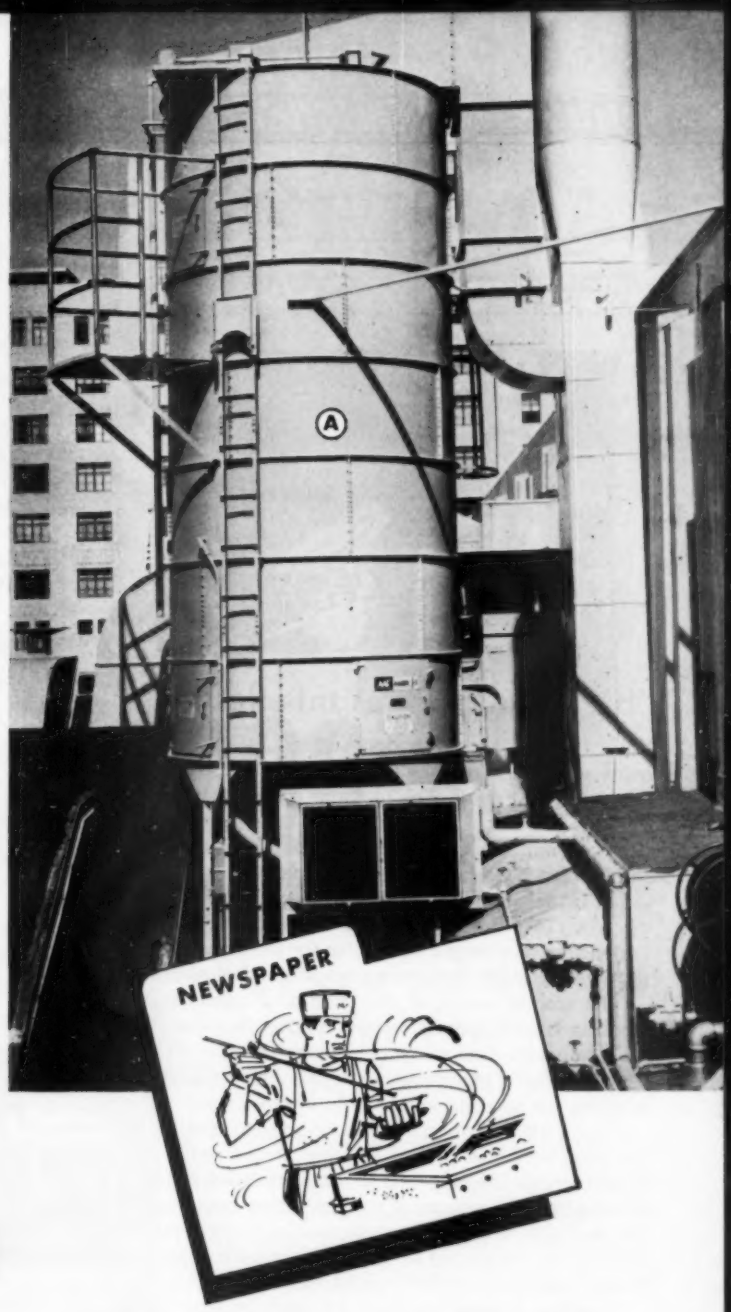
BAG SHAKEOUT

The photo gives you a pretty good idea how many mailbags are handled in the U.S. Army Terminal Post Office at Oakland, California. With workers shaking out each bag after emptying, you can imagine the extent of the double problem—worker discomforts and excessive housecleaning costs.

Solution: An automatic dust "pullout" system involving an AAF Type W ROTO-CLONE (A) exhausting a bag-cleaning platform (B). The empty bags are merely shaken slightly over the perforated platform and the ROTO-CLONE does the rest. The collected dirt is turned into a harmless sludge and the air is re-circulated into the room.

Water sprays extend the effectiveness of the wet-collecting Type W ROTO-CLONE to collection of the finest and lightest dust particles. It requires little maintenance, uses a minimum of water and maintains its efficiency regardless of air volume. Perhaps it could solve a problem for you. Bulletin 274 gives detailed product information.

Problem-solving with AAF Dust Control



Problem: LEAD FUMES

A big-city newspaper like the Los Angeles Times-Mirror has to melt lead, and melting lead produces fumes. The problem was how to get the fumes out of the building without creating a new problem — air pollution — in the process.

Solution: An AAF reverse jet fabric arrester — the AMERjet (A) — exhausts the lead melting pot, removes the fumes and dispels nothing but clean air to the Los Angeles atmosphere.

The AMERjet will handle heavy dust loadings of materials of varying nature with a constant pressure drop that assures accurate control. It will collect even invisible particles dry for reclaiming.

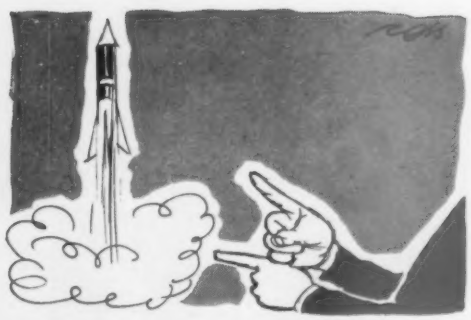
Maybe it could solve a problem for you. For complete product information on the AAF AMERjet, call your local AAF representative or write for Bulletin 279.

Address: Robert Moore, American Air Filter Company, Inc., 361 Central Avenue, Louisville, Kentucky. In Canada, American Air Filter of Canada, Ltd., 400 Stinson Blvd., Montreal 9.

AAF **American Air Filter**
BETTER AIR IS OUR BUSINESS

HUMAN RELATIONS

By Vivian Lunardi, Assistant Editor, FACTORY



"Sign" talk moves missiles

Walk through a certain door where 11 supervisors are assembled. You may not hear a word spoken, yet they are conversing. The medium is "sign language" and this is a class for both the deaf and the non-deaf.

The communications program, sponsored by Lockheed Aircraft Corporation, Sunnyvale, Calif., has two aims. One is to teach new and specialized terms of electronics and missile-making to the deaf. With this knowledge they would be eligible for the same courses in manufacturing skills open to other employees.

The second aim is to give non-deaf supervisors a working knowledge of "signing" so that they can communicate with deaf workers. There are some 40 deaf persons, chiefly electronic assemblers and machinists, working on satellite and missile components.

Credit for this program goes to an instructor in the company's education and training department. Self-taught in sign language, he suggested putting to better use the unusual powers of concentration possessed by the deaf (on work such as electronics assembly). To do this, he was forced to coin new signs for space-age words such as transistor, capacitor, or modules.

Separate classes are held for each group. Supervisors, after 20 hours of instruction, are able to "sign" about half as fast as they could talk. The program is paying off for Lockheed. Not only is it developing a reservoir of highly skilled talent among the deaf, but it is creating much good will and cooperation between supervisors and their deaf workers.

Big oaks from little acorns...

Small, locally owned industrial companies play Santa Claus with more splash than big, nationwide service companies these days. As a team, however, the two groups in 1959 donated about $100-million, or approximately 7/10 of 1% of pretax income to health, education, and welfare causes. These figures come from a recent National Industrial Conference Board (New York) study of 282 American companies.

In relation to their employment and assets, small firms poured out more money. Those with fewer than 500 employees donated an average of $45.26 per worker, while those with 10,000 or more gave $20.12.

Industrial companies outdid service companies—0.83% of pretax income as against 0.45%, while public ownership surpassed privately held firms.

No longer are health and welfare agencies gobbling the lion's share of gifts. This study shows education rising to second place with 39.1% of the take compared with 45.1% for health and welfare. In a 1955 study, the percentages were 31.3 and 50.7.

Plants: an annex to schools?

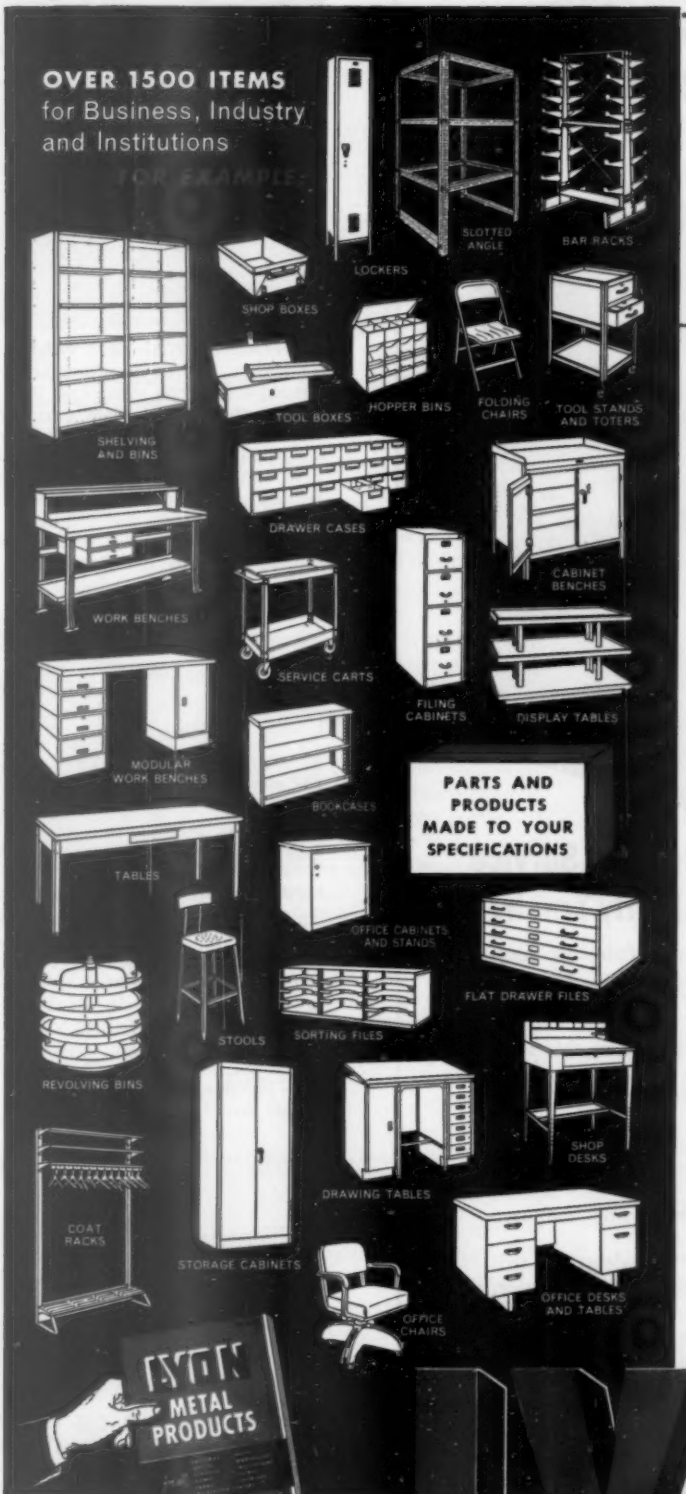
Freeways must be built between plants and schools to permit an easy exchange of theory and practice. Now, at best, there's only a bumpy road between companies and colleges. This is a mistake, reports Dr. S. W. Brossman in a *Manage* magazine article.

Graduates now enter plants knowing little of what to expect. They have few classroom lectures by actual plant representatives. And most have never before been in a manufacturing facility. What we need, suggests Brossman, are more school people inside industry and more industry people inside schools.

Why not on-the-job training in industrial plants for the college student? And why not exchange plant engineers with college instructors for a semester or two? Such interaction would improve industry's recruiting program, guide school curricula to meet business needs, and raise educational standards.

Brossman predicts the day will come for a fusion between industry and schools. Local plants will then set aside part of their facilities to train college students. When that happens, it will be the greatest boon to education since Russia's sputnik shocked us out of our little-red-schoolhouse apathy, he concludes.

Turn the page



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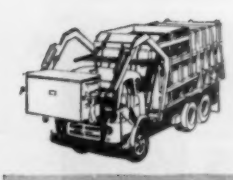

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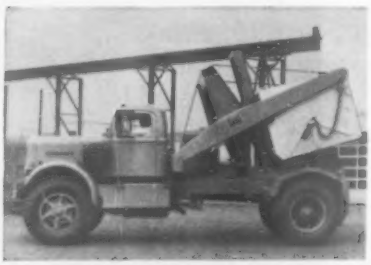
NEW PRODUCTS

CONTAINER FOR HOT MATERIALS

This 6 cu. yd. tilt-type container was specially built to store and handle a high-temperature dusty product. It has cooling fins, a counter-balanced spring-hinged lid and a 16" sliding gate valve. When full it is picked up, hauled and emptied by a Dempster-Dumpster. Details are contained in a free brochure entitled "Special Containers." Dempster Brothers, Inc., Knoxville 17, Tenn.



NEW LFW HANDLES CONTAINERS

This new LFW 603-C, mounted on a White Mustang, was produced to handle scrap metal storage containers. It will handle containers in capacities up to 15 cu. yds. in all Dempster-Dumpster models. Lifting capacity is 18,000 lbs. Dempster Brothers, Inc., Knoxville, Tenn., offers a catalog brief No. 160 describing this and other materials handling systems.

PORTABLE FUEL OIL TANKS

This 2,000-gallon tank was produced for operation at temperatures as low as −90° F. It features its own pump and gasoline engine. Prime mover is a truck-mounted Dempster-Dinosaur which hydraulically lifts the tank into carrying position and puts it off. A new catalog section No. 12 describes the development. Dempster Brothers, Inc., Knoxville 17, Tenn.

Advertisement

Begins on page 134

HUMAN RELATIONS

Escape that paper landslide

Why be buried by an avalanche of business and technical literature when there's an easy way out? We're not suggesting the waste basket, either. That's one way to lose a significant article and kill all those bright ideas you're trying to sell the boss.

Rogers, Slade and Hill, New York consultants, quote one manager's experience with the paper problem. He flips through each magazine or report as it comes in. From headlines, subheads, and lead sentences he can tell immediately those that are important to him. He marks them for his assistant.

The assistant then clips marked pieces, underlines key thoughts, and returns the clippings to the manager. Thus marked, the substance can be quickly extracted, and the clipping thrown away, filed, or saved for a complete reading at a later date.

This procedure takes about a half-hour weekly and accomplishes three things. It saves you from plowing through every page and line; it leaves your evenings at home free; and it permits you to choose what is important without delegating responsibility to a subordinate who may not have your awareness.

VIP—ornery but resolute

Look around you at the next management conference. Are you one of the 10% slated to move into top executive spots? That's about par for the VIP green, say Edward N. Hay & Associates, Philadelphia.

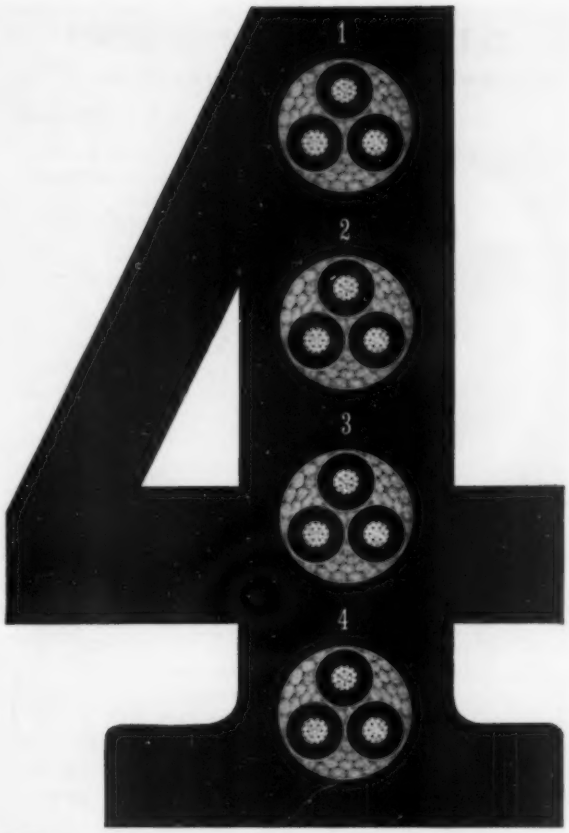
Most middle-management men don't have the intestinal fortitude or plain, ordinary "guts" to get to the top. Only "leaders" are willing to stand alone and accept full responsibility for decisions. What distinguishes a successful executive? In a study of hundreds of executives earning from $6000 to $100,000 annually, these eight features stand out:

1. Higher than average IQ, at least 124, or 24 points more than the general population.

2. Most are well educated. This does not imply college degrees. Those not college-trained take special courses while on the job.

3. Broad interests, reflecting active curiosity. This indicates successful executives are better informed.

Turn the page



Four to choose from
in high-voltage power cable

You can match precisely the conditions your high-voltage power cable is exposed to when you specify Rome.

The reason is simple: Rome offers both oil-base and butyl-base insulation as well as a choice in jacketing.

Four of the more popular combinations are: (1) Rozone inside . . . Roseal outside, (2) Rozone A inside . . . Roseal outside, (3) Rozone inside . . . Roprene outside, (4) Rozone A inside . . . Roprene outside.

With *Rozone* you have a premium oil-base insulation with high resistance to corona, ozone and water, as well as high dielectric and impulse strength. *Rozone A* (butyl-base) has excellent ozone resistance and also protects against extremes in temperature.

In jacketing, *Roseal,* a thermoplastic compound, provides excellent mechanical and weather protection. It also resists abrasion, heat, flame, moisture, oils and most chemicals. It is recommended as a nonmetallic sheath over shielded and unshielded power cable and can be used underground or overhead.

Roprene, a thermosetting compound, provides added heat resistance plus adequate resistance to most environments. Unlike fibrous coverings, it does not need to be cut back at terminals and splices. So it completely protects exposed ends on unshielded cables. Like Roseal, this compound can be used overhead or underground.

Need high-voltage cable now? Rome offers "off-the-shelf" delivery for many types. Get all the facts from your area sales office. Or write to Rome Cable Division of Alcoa, Dept. 21-81, Rome, N. Y.

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DIVISION

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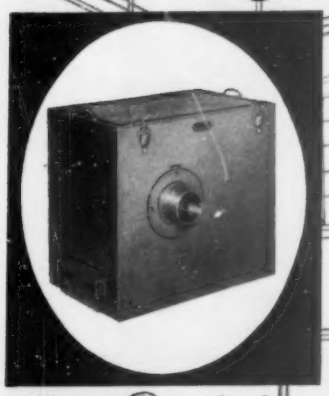
DUSTKOP "520"
designed to collect dust from single machines



portable— easily installed

DUSTKOP STOPS DUST

Self-contained Dustkop models, like the "520," are practical and effective in collecting dust from single machines. They're designed specifically for service with surface grinders, tool and cutter grinders, offhand grinders, buffers and other small wheel equipment. These units are also easy to install — are actually portable — and very economical to operate.

Write for illustrated literature
46 models to choose from!

NEW DUSTKOP AUTO SHAKER shakes filters AUTOMATICALLY

AGET manufacturing company
1410 E. Church Street, Adrian, Michigan
ask for details

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Gunk Chicago Co., River Forest, Illinois
serving the Midwest and Southwest
Radiator Specialty Co., Charlotte, No. Carolina
serving the East, Southeast and far West

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Begins on page 134

HUMAN RELATIONS

4. Strong in mathematics. This trait simplifies learning accounting and financial end of business.

5. Large vocabulary partly due to much reading.

6. Preference for variety and change in work rather than for familiar and stable situations. Risks are a challenge, security a bore.

7. Flair and enjoyment for directing people.

8. Aloof, yet friendly at right time and place without allowing friendliness to impede achieving results. Can be tough and hard, occasionally angry and hostile —not a "nice guy."

Downtime gremlins on the run

"Foul-It-Up Filbert" is the imaginary figure plant engineering management is using to fight downtime at Lockheed Aircraft Corporation's southern division, Marietta, Ga. He's the fellow who gets paid only when he succeeds in fouling up machines. And that happens too often to suit management.

What's more, Filbert's pay amounts to a pile of money. But it's the kind you can't see, can't spend, and can't keep. It gets tagged on to the product price. This fellow is on the job every day (for the competition) looking for operators who aren't on the ball.

All Lockheed machine operators received a briefing on the operations of Foul-It-Up Filbert. They agreed to close ranks. Organized into groups (one for each cost center), they're out to reduce Filbert to a starvation diet. The group chalking up the least downtime for six months will get special recognition.

Ammunition to fight Filbert is attached to each machine. It's a silver-colored decal listing 10 basic steps for use of machine tools. Some of the steps: keep the machine clean; don't tamper with it; use safety devices; don't use hose to clean it; and call your maintenance department at the first sign of trouble.

An argument for safety

If you have any doubts about the need to emphasize safety, here are a few grim statistics to convince you. On-the-job in 1960, one worker was injured every 16 seconds, and one died every 38 minutes, says the National Association of Manufacturers, New York.

The Sign of a Real Bargain in an IRON BODY GATE

Cost-Per-Year is Lower... Initial Cost no Higher

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Today, these widely favored valves are an even bigger bargain in true value. *You pay no more for them at the start!* And you get exactly the same high quality and perfection of design for your money.

You can satisfy all your needs from the complete line of Jenkins Iron Body Valves. Jenkins Bros., 100 Park Avenue, New York 17.

AVAILABLE FROM LEADING DISTRIBUTORS EVERYWHERE

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MOST TRUSTED TRADEMARK IN THE VALVE WORLD
VALVES
JENKINS SINCE 1864
Jenkins Bros

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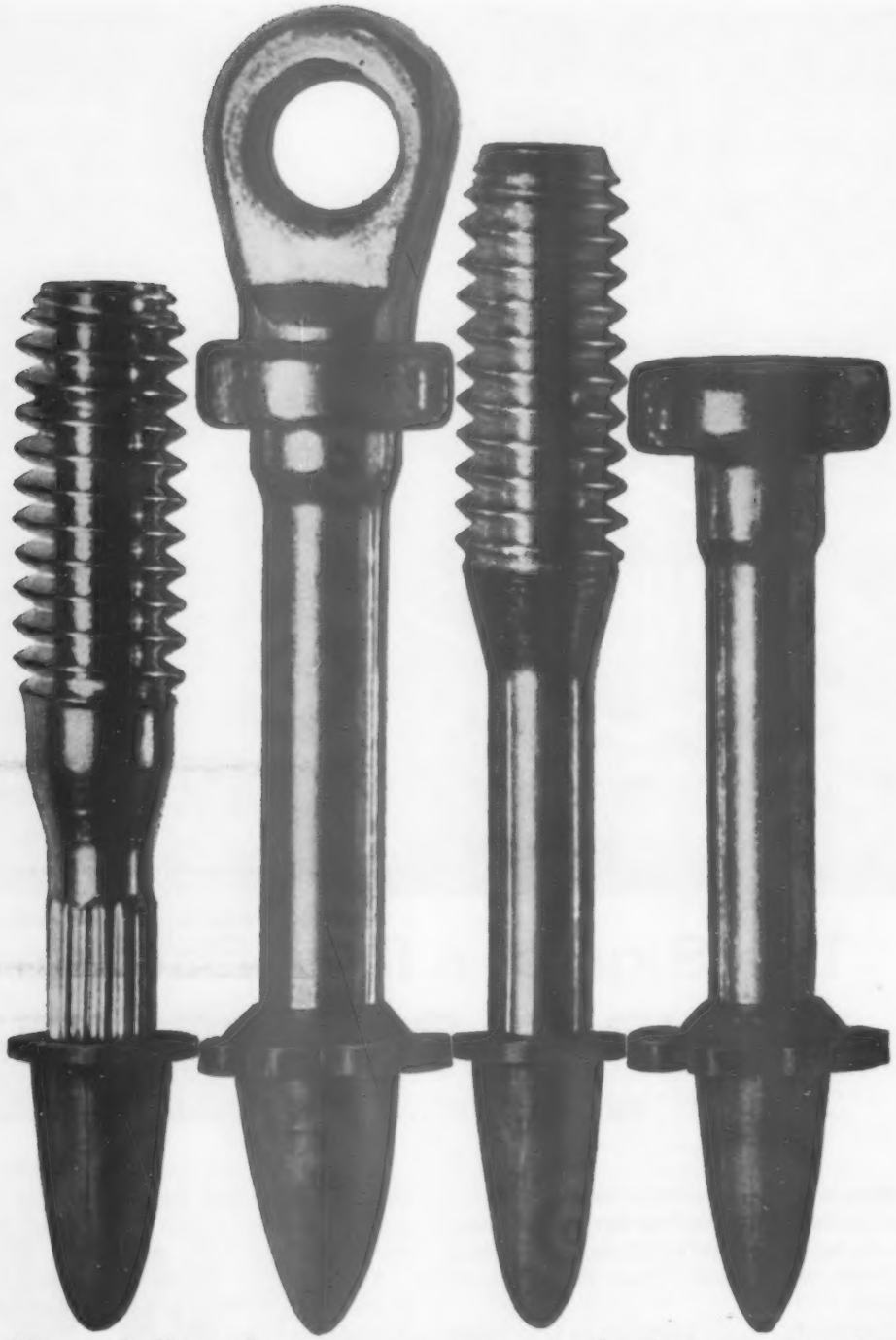


Together, fellow fasteners, we can build an empire!

There are 125 different kinds of us, all strong and true and ready to carry our share of the load! We're powder-actuated and we mean business. We have threaded studs and drive pins (super-nails!). There's tall ones, short ones, in-between ones; there's fat ones and there's lean ones. Every last one of us can ram home into steel or concrete with ease. One every *fifteen seconds*. We can attach things down on, up against and suspended from. With our eyepins the Hanging Gardens of Babylon would still be hanging! We're the kingpins. We're the elite. We're austempered, to a man. A tougher group you'll never find. So give us a chance, that's all. Give us a chance and by the George Washington Bridge we'll build you an empire!

Our dealers are assistant empire-builders, but they're listed in The Yellow Pages under TOOLS. Talk to them about *your* empire. (Among other things, they'll tell you why we have red tips.)

Ramset®

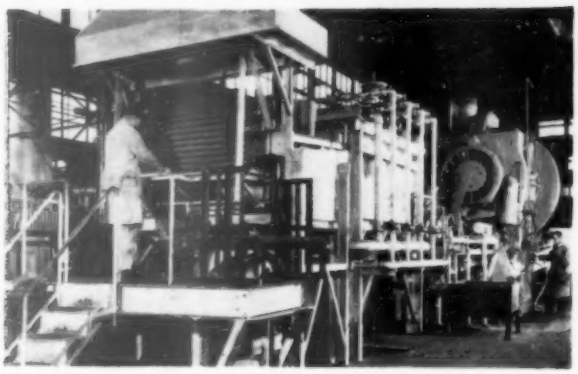
288-H Winchester Ave., New Haven 4, Conn. WINCHESTER-WESTERN DIVISION **Olin**

Check on truck obesity

Page 143

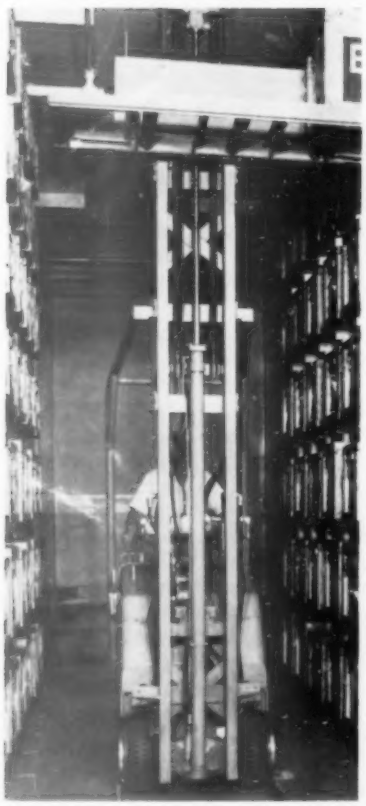
Forging goes streamlined

Page 142



Multi-speed conveyor

Page 147



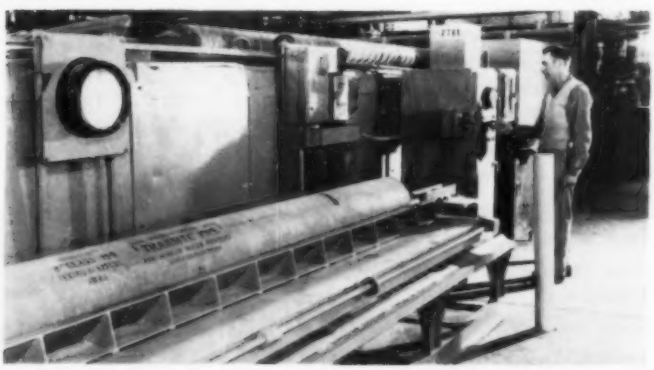
Rail rider saves space

Page 148

FACTORY'S CASE BOOK OF

ENGINEERED PLANT SAVINGS

TABLE OF CONTENTS FOR THIS SECTION ON NEXT PAGE ►



Gauging pipe electronically

Page 151

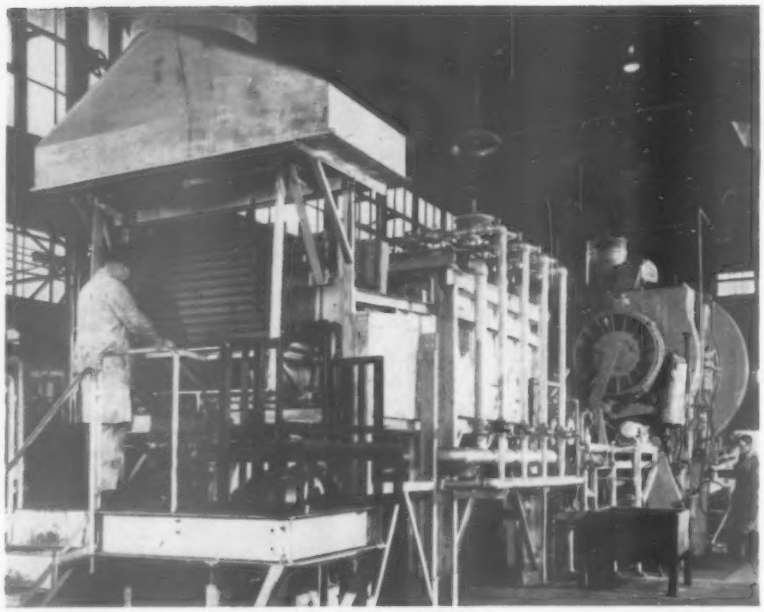
FACTORY'S CASE BOOK OF

ENGINEERED PLANT SAVINGS

NORMAN H. SOLON, EDITOR

No. 45 August 1961

Streamlined forging—fast and scale-free 142
Translucent tanks combat corrosion 143
Tattletale light chases cops 143
Student pranks go space age 143
Cargo keeps cool 143
Costless way to plant feeding 143
Strike losses at a glance 144
Staples speed shipping 144
Disaster control on a limited budget 144
Substation for narrow space 145
This truck was built to ward off sparks 145
No-slip answer to oily problem .. 145
Keeping an eye out for missing links 145
Camera peeks underground—in color 146
Automatic annealing 146
Pushbutton mill bypasses hands 146
Taking gobbledygook out of budgets 146
Four efficiency boosters 147
The independent bargain 148
Choo-choo fork truck runs on rails 148
Plastic gets a tonic 148
This hose takes a beating 149
Jet cleaning is accountant's delight 149
Got competish? Let your workers know 149
Case Book capsules 149
Jet air shipments sans cartons 150
Bells move to paint electrostatically 150
Diagonal supports save handling 150
Invoice dubs as calling card 151
Keeping bugs away from control panels 151
X-ray dopes out pipe width 151
Trouble-shooting templates 152
Corrosion MPs on guard duty .. 152
Computer bosses paper machine 152



STREAMLINED FORGING

—fast and scale-free

An automated forging system is reaping multi-benefits at AmForge Division (Chicago) of American Brake Shoe Company. It speeds production and keeps finished parts virtually free of mill scale—in sharp contrast to hammer-forged parts.

A transfer mechanism moves hot billets from an 8-burner gas-fired furnace to a 2500-ton press (Erie Foundry Company, Erie, Pa.). The press contains four progressive dies, and a pair of fingers move billets from one die to the next. A conveyor belt following the last die carries the finished part and associated trim scrap to a container.

Billets were formerly heated first in a standard oil-fired furnace and then hand-carried to the hammer man who shaped and finished the part. From there, the forging passed through a separate trim press to remove flash. Finally, a hot coining operation was needed to correct irregularities and bring the part to print specifications. Only 300 track links an hour could be produced with this method. Under the new set-up, AmForge produces 900 track links an hour and will step this up to 1200 when sales increase.

Here's how the system operates: One man feeds cold 7-lb. billets into the furnace in four rows of 65 each. They remain in the furnace about six minutes and are heated to 2100 F. On the discharge side, a transfer mechanism (Wilson Automation Company, Detroit) moves each billet individually to the press.

Mechanical fingers in the press advance the billets from die to die. The first two dies are blanking, the third is a finisher, and the fourth is a coin and trim die.

The system is designed for automatic maintenance. Air jets mounted on the fingers cool the dies. And only two billets are in the press at any one time, so alternate dies have an extra chance to cool.

AmForge will also use the system to make automotive gears, conveyor belt links, high-pressure valves, and other high-volume forged parts. It will be further refined in the future with a change from manual to magazine loading of the furnace. And the company is developing a method to separate flashing from finished parts automatically.

Payoff: Operation of the mechanized line requires only two or three men. It would take 15 men to produce the same number of parts in a conventional hammer forge shop.

Shorter forging time has reduced mill scale to a point where further treatment is unnecessary.

Translucent tanks combat corrosion

There's no secret about how much liquid is in resin-bonded Fiberglas tanks at Owens Corning Fiberglas Corporation, Aiken, S. C. The tanks are translucent.

With the steel tanks formerly used, the level could only be inspected by opening a cover and using a dip stick. This meant that noxious fumes escaped into the room. Also, minute quantities of metallic pick-up were found in liquids stored in the steel tanks, causing contamination. Since the new Fiberglas tanks were installed there has been no sign of corrosion.

The resin was made by du Verre, Inc., Buffalo, N. Y.

Tattletale light chases traffic cops

There's no worry about a truck being ticketed for illegal loads after it leaves the dispatch center at Douglas Aircraft Company, Santa Monica, Calif. An electric eye and two scales (Fairbanks, Morse & Company, Chicago) keep the trucks highway patrol-proof.

Height is checked by a photoelectric cell set at 13½ feet, legal height in California. If the load is a fraction over this, a switch is tripped and a light goes on.

To guard against overweight, two scales are installed flat on the pavement for easy access. The scales are pre-set for 8000 pounds by means of a miniature precision switch on the lever arms. If the weight of any one wheel exceeds this amount, a buzzer will sound and a light flash on. The set-up can be clearly seen and heard from the dispatcher's office across the street.

The system had one bug at first. The afternoon sun shining on the electric eye often gave a false alarm. This was cleared up by extending a 2-in. tube, 5 feet long, directly out from the cell. No extraneous reflections can penetrate the long tube, even near sunset.

Student pranks go space age

If you have fond memories of goldfish swallowing, panty raids, or phone-booth squeezing during your undergraduate days—brother, are you out of date! Today's students think space age, as Sperry Gyroscope Company (Great Neck, N.Y.) recently had reason to discover.

The company lent a 35-ft.-high model of a Polaris missile to Massachusetts Institute of Technology to exhibit during the school's centennial celebration.

After one night on campus the plywood model mysteriously vanished. No Red spies were involved —just freshmen. Later it was discovered in one piece in MIT's undergraduate dorm. Damage: One crabapple tree rammed by the missile.

Cargo keeps cool

This delivery truck actually becomes part of the plant's storage area with the handling system at Carnation Company, Torrance, Calif. The truck insures the loading and unloading of cargo at the plant with no loss of sub-zero air—even during the dog days of August.

A foam rubber seal surrounds the dock doors of the plant's cold room. This forms an airtight compartment when standard refrigerated vans are backed up against the rubber seal. In effect, this means that the van's interior and the cold room are one continuous area.

The loading facility is equipped to handle four vans at a time.

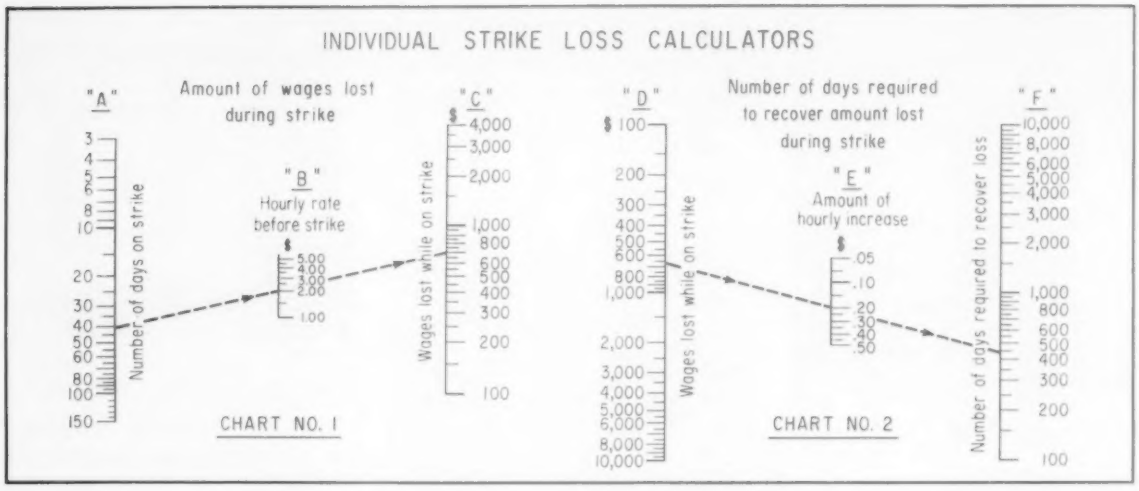
Fast, costless way to plant feeding

You don't have to subsidize a sophisticated cafeteria to make in-plant feeding practical. Westinghouse Electric Corporation's Boston plant feeds a factory population of 1000 in a single-hour lunch period. The average cost for a complete hot meal is just 60 cents. A vending machine system (Brass Rail, Inc., New York) does the trick.

The system replaced a three-cafeteria service area, which took up valuable space. Feeding is now centralized into one area, within five-minutes' walking distance of any point in the 5-acre plant.

The new system hasn't decreased the variety of food offered the workers. The subsidy-free menu includes 60 hot dishes, a wide choice of salads, hot and cold sandwiches, soups, and beverages.

Result: An actual increase in the percentage of personnel using cafeteria facilities.



Labor's strike loss at a glance

Who's the winner in a strike? In most cases, labor and management are both losers. Although the company may absorb big losses, it's the individual striker who percentage-wise suffers the most. Even if he succeeds in gaining the wage increase he desires after a substantially long strike, he still loses. It takes months and years for him to recoup his loss in earnings.

Larry Megow, general manager of Hahn & Clay's Steel Fabricating Division, devised the two charts above. They pinpoint a worker's loss during a strike and tell how many working days it will take just to make up his lost earnings even if he wins his increase.

Here's how to use the charts:

Chart No. 1 shows the wages lost while on strike. With a straight edge, connect the number of days on strike (Column A) with the individual's hourly rate before the strike (Column B). Where the rule intersects Column C you will find the amount of wages lost during the strike.

On Chart No. 2 connect the lost wage figure in Column D with the hourly increase won (Column E) and carry it out to Column F. This gives the number of work days required to recover the strike loss.

The problem on the charts is worked out this way: Suppose a worker earning $2 an hour went on strike for 40 days. Then assume he went back to work with an increase of 20¢. Using the left-hand chart, you'll find his loss would be around $700. The right chart shows it would take almost 450 working days merely to break even. That's almost two calendar years.

Source: Larry Megow, General Manager, Steel Fabrication Division of Hahn & Clay, Houston, Tex.

Staples speed shipping schedule

It takes just half the time to package and ship goods at B&C Metal Stamping Company, Atlanta, Ga., now that carton-fastening is done by stapling instead of taping. The carton also looks neater and the company's trademark is no longer obscured as it often was by the 3-in. kraft paper tape formerly used.

To make up the cartons, the operator first staples the bottom with a foot-operated stapler (Bostitch Company, East Greenwich, R. I.). Just five staples are needed. The top is then closed by a portable stapler, requiring four staples.

Result: A saving of $5 per 1000 cartons in material costs alone.

Disaster control on a limited budget

A plant civil defense and disaster control plan need not be a budget-wrecking luxury. Marotta Valve Corporation, Boonton, N. J., with 140 employees, set up an efficient no-frills program for only $1000.

Secret: Employee cooperation.

Every man in the program is a volunteer, and only the most qualified are selected. Before being enlisted, his special "disaster" skills are surveyed and placed in a central file. A committee reviews every piece of disaster equipment already on hand before ordering new items. This is of prime importance because of the limited budget.

A control was built into an old basement darkroom directly under the plant's main switchboard. The

room has running well water and an 8-in. reinforced concrete ceiling.

A notebook-size plant layout chart is handed to each volunteer. It indicates exit, window, valve, and fire-fighting equipment locations.

A sales engineer has been named civil defense and disaster control coordinator. On his staff are an industrial mutual-aid liaison and county CD liaison man. The plant CD organization consists of directors of transportation; maintenance operations; welfare, health, and medical; fire and police; communications—all under company control.

There's a duplicate control center and a 92-man heavy-duty shelter in the president's (Pat Marotta) home two miles from the plant. Cost for the installation was assumed by Marotta himself.

Payoff: Just like insurance, the program pays off best when it's not needed. But it also pays dividends in peace of mind, and can be the difference between life and death for scores of workers—as well as for the company itself.

For more about plant disaster control, see June FACTORY, *page 230.*

THIS TRUCK WAS BUILT TO WARD OFF SPARKS

Since this diesel-powered truck is used to haul solid rocket fuel, among other things, an accidental spark could cause quite a bang at Hercules Powder Company's Bacchus, Utah, plant. But the 18,000-lb.-capacity truck is designed for safety. It operates without an electrical system. The engine is started hydraulically and all gauges are mechanical. The truck has conductive rubber tires, aluminum fan blades, bronze carriage bushings, nickel-plated rollers in carriage and upright, and a water muffler. It was made by Clark Equipment Company, Battle Creek, Mich.

Substation solves space shortage

If you think installing a 1500-kva. transformer substation (7200 to 240/450 volts) means a space problem, take a gander at this set-up at Cook Heat Treating Company, Houston. The transformers are mounted on an 18-ft. rack, 20 feet off the ground, in a narrow casement between the road and the building.

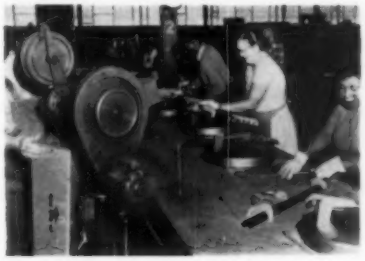
The installation was made feasible by recent developments in smaller, lighter-weight oil-cooled transformers (Westinghouse Electric Corporation, Pittsburgh). Note the simplified secondary cable installation, which eliminates many of the insulators previously required.

No-slip answer to oily problem

A builder's material has proved the answer to a slippery problem at Hamilton Watch Company, Lancaster, Pa. Oil splashed from automatic and semi-automatic machinery created a serious hazard for employees, who frequently slipped on the floor.

Homosote (Homosote Company, Trenton, N. J.), approximately ¾-in. thick, was laid on the floor. When the oil falls, it soaks into the material, but doesn't make it slippery. It has also improved the appearance of the area—by eliminating oil rags and sawdust. And since the Homosote covering eases standing on the floor, it alleviates worker fatigue.

Contributions from readers reporting experiences will be welcomed. No need for fancy writing; just a clear, concise statement of facts. If you have photos or drawings, be sure to include. We'll edit for the Case Book. Contributions accepted will be paid for at time of publication. Address: Case Book Editor, FACTORY, 330 West 42nd St., New York 36.



Keeping an eye out for missing links

Here's a clever way to avoid accidentally leaving an item out of a package before shipping. And it doesn't involve the tedious task of checking each small part with a list. Structo Manufacturing Company, Freeport, Ill., uses die-cut pads, punched with the correct number of holes and slots, to hold the large loose parts in one package. If all spaces on the pad are filled, the package is complete.

Small parts, such as cranks and wheels, are prepackaged in transparent blister packs also designed with a place for each part. If there is an item missing, production-line workers can easily spot it.

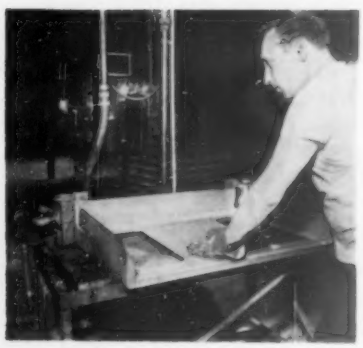
The system was designed by Stone Container Corporation, Chicago.

Camera takes a peek underground in color

The decidedly unglamorous interior of Jersey City (N. J.) Sewerage Authority's sewer pipe received a photo test in color recently. Purpose: to test the condition of the Bitumastic (Koppers Company, Inc., Pittsburgh) coal tar protective coating of the 24-in. concrete line. Here's how the test was made:

A waterproof 16mm camera with a self-contained strobe-light source was mounted on steel runners and conveyed along the length of the pipe by a special cable-pulley arrangement. The cable automatically triggered the shutter for a wide-angle color exposure at 2-ft. intervals.

The photo tests were conducted by Jersey Testing Laboratories, Inc., Newark, N. J.



Automatic annealing

This table-top automatic annealing system has boosted quality of product, at the same time cutting operation time in half at Welbilt Corporation, Maspeth, N. Y.

Stove-top corners were formerly annealed with an oxyacetylene torch after the stamping operation and before enameling. This time-consuming method caused production bottlenecks and costly rejects because of crazed enameled finishes.

Now high-velocity burners are mounted on each back corner of the table to focus heat uniformly on the stove-top corners, thus assuring good quality. When the operator pushes the stove top against the rear of the table, it hits a miniature precision switch which activates a solenoid valve. The valve opens to admit a gas-air mixture, and the idling burners light up and heat the workpiece to 1400 F., annealing both corners simultaneously. After a predetermined heating cycle—ranging from 7½ to 9½ seconds—the timer switch turns the burners to idling. A firecheck is used to extinguish flashbacks.

The combustion system is supplied by Selas Corporation of America, Dresher, Pa.

Pushbutton mill bypasses human hands

This is the tail end of the pushbutton copper rod rolling mill (Continental Copper & Steel Industries, Inc., Linden, N. J.). Here copper is automatically coiled, tied, and placed on a turnstile machine that feeds it to a fork truck. Worker at rear has only to push an ocasional button and act as a sightseer.

At the beginning of the line, 265-lb. bars of electrolytic copper are fed into a 1700 F. furnace. They emerge red-hot and travel automatically through a series of mills, where the metal is shaped into 5/16-in.-dia. rods, then coiled, tied, and delivered to the fork truck.

The $3-million mill was designed by Baldwin-Lima-Hamilton Corporation, Philadelphia.

Taking gobbledygook out of budgets

Budget reports handed to first-line supervisors at Minneapolis-Honeywell Company (Minneapolis) were accurate, detailed, and clear as mud. They included expenses not under the supervisors' control, and it took an industrial accountant with five years' experience to interpret them. As a result, supervisory interest in cost control lagged.

Realizing this, Honeywell management set up a program to revitalize interest. As Winston R. Willmert, manager of factory accounting, put it: "It's absolutely essential that factory management people communicate to first-line supervisors their deep interest in controlling costs. The supervisor's interest in cost control is directly proportional to his superior's." Here's the five-point program:

1. Assign a full-time cost coordinator to each department or group of departments. His job: to help the supervisor analyze his costs, make cost-cutting decisions.

2. Tailor reports to the supervisor. List only expenses that he directly controls, and educate him on the make-up of each expense item. Keep the record simple and speed up reporting time.

3. Develop devices to measure effectiveness of individual supervisors' actions as well as of the overall program.

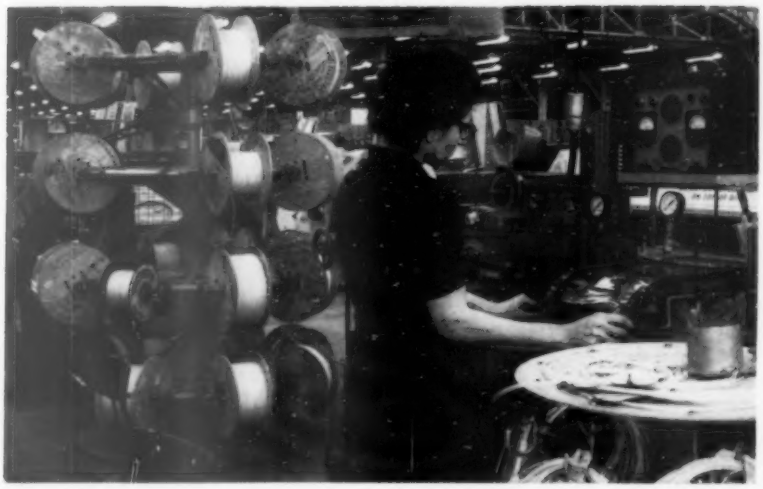
4. Instruct each supervisor to budget his own area. His superior can challenge this budget, but he cannot change it without getting the supervisor's consent.

5. Hold conferences twice a month —once to cover the next month's budget and once to compare the previous month's actual with budget.

Before the program was instituted, the company educated the supervisors as to its objectives. A brochure was printed and give-and-take management-supervisor meetings were held. Supervisors were taken on a tour of the accounting section, where they saw how source documents were used and processed.

Management checked the results of supervisors writing their own budgets and found they set tighter goals than production engineering personnel. What's more, they worked harder to keep them.

SAFETY SIGNALS. Green light means all's right as far as safety is concerned. A red light, on the other hand, signifies a lost-time accident within the past 24 hours. To bring home the point still more strongly, a written report on the accident is posted prominently on the board at the entrance to the plant.



WHIRLABLE WIRE WHEEL. Wire tree is a specially designed rack to hold 32 spools of various gauges of wire. The plant-made rack enables operators to shift easily from one size wire to another while feeding a wire preparation machine. Estimated cost of the wire tree: $150 to $200 in labor and materials.

HANGERS HANG HIGH. Jumbo-sized hangers, 25 feet high, get coats and jackets out of the way when no lockers are available. The metal bar was specially made for coats.

CHANGEABLE CONVEYOR. Change-of-pace conveyor eliminates the need for spacing units to change production rate. A variable-speed gear costing $800 does the trick. Attached to an existing conveyor, it gives Temco more efficient and flexible operation.

FOUR CLEVER EFFICIENCY BOOSTERS...

are paying dividends at Temco Missiles & Aircraft (Dallas), a division of Ling-Temco Electronics, Inc. They can all be easily adapted for your plant without large capital expenditure.

YOU BE THE ARBITRATOR

THE CASE OF

The independent bargain

Out of the experience of the American Arbitration Association

A sugar refining company established a new experimental department, equipped it with a new type of granulator and staffed it with five salaried employees who were not members of the bargaining unit. The union filed a grievance.

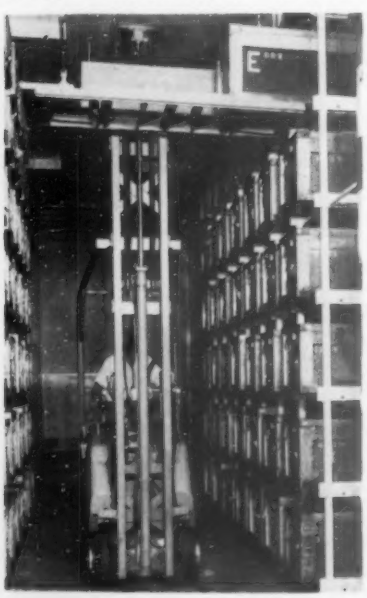
"Under the contract," the chief steward pointed out, "production work is to be done by hourly rated employees who are members of the bargaining unit. Even if they don't belong to the union, you have to bargain with us about their wages and conditions of work. You can't arbitrarily decide to carve certain work out of the unit and engage in individual bargaining."

"We recognized the union as the exclusive bargaining representative of all hourly rated employees," conceded the plant manager. "But these five men are in another class. They are no different from engineering and research personnel we have always employed outside the bargaining unit. Besides, they're not taking any work away from union members. The sugar they work on eventually gets back into line for processing by hourly rated employees."

Eventually, the case went to arbitration. Suppose you were the arbitrator. How would you rule?

For the actual decision turn to page 152

Choo-choo fork truck runs on rails



A rail-guided lift truck is beating the storage space problem at Eastman Kodak Company, Rochester, N. Y. The 1-ton-capacity truck (Clark Equipment Company, Buchanan, Mich.) travels on rails, thus assuring accurate positioning of loads in relation to six-tier storage racks, and eliminating need for steering. This system is effective where close clearance exists between end of the loader attachment and racks.

The Clark side loader in this case can be shifted laterally to feed 600-lb. boxes into storage bins on either side of the aisle. The attachment has live rollers, which are powered through roller chains driven by a hydraulic motor.

The direction of rollers and positioning of the attachment is controlled by the operator who stands on the rear platform of the truck.

Plastic gets a tonic

Strengthened high-density polyethylene caps are playing nursemaid to packages being shipped from Westinghouse Electric Corporation's Newark, N. J., plant.

The big problem Westinghouse had to overcome in designing this system was that high-density polyethylene is normally not as effective for cushioning, shock, impact, or vibration protection as other packaging materials. However, incorporation into the design of the polyethylene of a series of formed, concentric, continuously extending sections in the end caps strengthened the material.

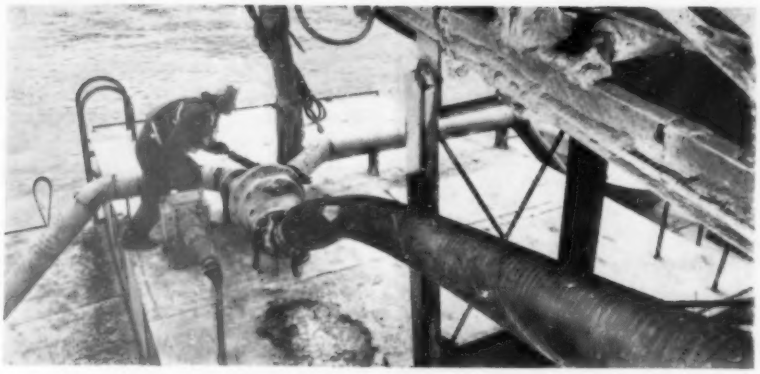
The caps are molded to fit the outer end of the product to be shipped. They are snapped on at either end of the unit, thus positioning it firmly in suspension within the protective enclosure.

The system protects delicate switchboard apparatus against all hazards of handling, transportation, storage, and climate.

For most commercial purposes, the product is only partially encapsulated. But when military specifications warrant, it can be completely enclosed. And the material can be sealed to conform with the most rigid specifications for moisture or vapor-barrier packaging.

Payoff: A 50% reduction in packaging time and materials.

Reprints of the Plant Operations Case Book are available. Price 50¢. For quantity prices, write Reader Service Department, FACTORY, 330 W. 42nd St., New York 36.



THIS HOSE TAKES A HECK OF A BEATING . . .

. . . yet it's withstanding abrasion and heat conditions that would reduce solid rock to powder at Green Bag Cement Company, Pittsburgh. The 46-ft. Convertapipe hose (B. F. Goodrich Company, Akron, Ohio) carries cement at a rate of 600 barrels an hour. Temperature inside the rubber hose often reaches 200 F.—high enough to destroy other types of hose—as granulated slags and silca sand fly through under a pressure of 30 psi. The hose has been in operation for 15 months, usually for 16 hours per day. The wire-reinforced hose previously tested lasted only two months.

Jet cleaning is accountant's delight

Hydraulic jet cleaning has made a big dent in housekeeping costs in several Ford Motor Company plants. These standard stock containers (top photo) are an example.

They used to be cleaned by private contractors for $4 each. Two plant maintenance men can now clean 50 of them in four hours.

The hydraulic jet units (Sellers Injector Corporation, Philadelphia) are placed at stations with pipe connections for both cold water and plant steam. Detergent is drawn from a storage drum in pre-set proportions through the siphoning action of the unit.

The water is delivered at a discharge pressure two to 20 times the input steam pressure. This provides needed impact for hydraulic scrubbing action, plus a high-stream velocity of more than 120 miles per hour. The units are used in garage areas to clean parts, engines, and fork trucks (bottom photo).

Got competish? Let your workers know

All 80 employees of Arrow Tool Company traveled by charted buses from the plant in Hartford, Conn., to the Exposition of the American Society of Tool and Manufacturing Engineers in New York. Purpose: to get a first-hand look at what their competition is doing.

The working-day trip included a luncheon, sightseeing, and shopping. However, the afternoon was spent viewing booths that were related to Arrow's specialties.

Benefit: Competition is now more than a word to these workers. They received a glimpse of what their company is up against. And it was an excellent morale booster.

CASE BOOK CAPSULES

Fire-alarm device that will sound an alarm if temperatures reach any one of some 100 points has recently been installed at Kuwait Oil Co., Ahmadi, Kuwait. The equipment is manufactured by Honeywell Controls, Ltd., London.

Happy air-cleaning system for industrial use is being marketed by Elotec Corp., El Monte, Calif. The unit electrostatically filters 97% of foreign matter from the air. It also produces negative ions that give many people a keen sense of well-being and alertness.

Portable x-ray unit, devised by Westinghouse Electric Corp., Pittsburgh, gives suspicious packages a quick check. It's so compact it can be toted around the plant as luggage. Only power requirement: a standard 110-volt a-c supply.

Less volatile oils, with higher viscosity indexes than conventionally refined motor oils, can be produced by a new thermal diffusion technique, according to Standard Oil Co. of Ohio, Cleveland.

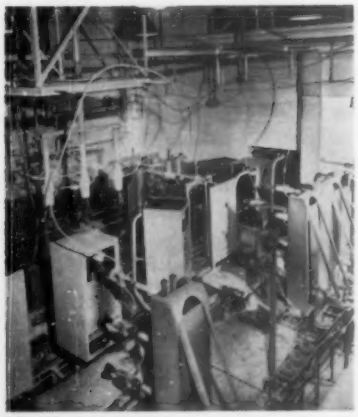
Storage disk for computer data can virtually eliminate reprograming time. It will hold from 50- to 56-million characters of information and can be linked to five computers —servicing two simultaneously. Developed by IBM Corp., the unit will rent at from $4400 to $7135 a month, or sell at from $231,000 to $339,500.

Industrial accidents caused the loss of 19-million man-days and $280-million in production in the United Kingdom last year. There were 190,000 reported accidents, of which 665 were fatal, according to the Minister of Labor.

Want "yes men" or "no men" on your management team? The former are likely to have weak self-control, follow impulses and suggestions of others. Habitual dissenters seem to have greater control, better stability, but resist attempts to influence them. So a Harvard University study indicates.

JET AIR SHIPMENTS SANS CARTONS

There's no need to pack goods in cartons before jet-shipping them at San Rico Sportswear, Hato Rey, Puerto Rico. To companies with container loads going in two directions daily, Pan American World Airways, New York, supplies capsules that can be loaded directly into jets. San Rico expects to save $10,000 to $12,000 yearly in material handling costs with the capsule system. Sportswear was formerly packaged in cardboard cartons and bound with nylon tape. It took three workers a full day to pack, label, and check addresses. Now two men take only two hours to prepare the capsules for shipment. They're made by Lockheed Aircraft Corporation, Marietta, Ga.



Bells move to paint electrostatically

Electrostatic painting need not be ruled out because of varying production requirements. A reciprocating spray bell system instead of the conventional reciprocating disk is being used at Kelvinator Division (Grand Rapids, Mich.) of American Motors Corporation. The moving bell system, with automatic controls for triggering and repositioning, accommodates mixed sizes of cabinets and doors on the paint line at the same time. The bells apply a uniform 1.8- to 1.9-mils coating on all parts, regardless of size.

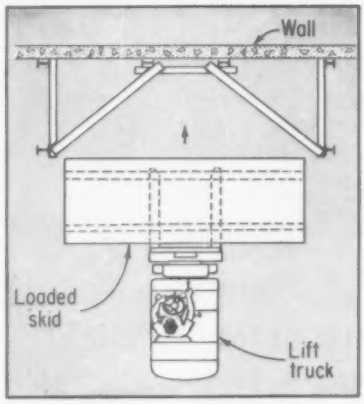
The present set-up replaces a battery of automatic air guns, supplemented by hand spray. Quality of the work has substantially improved, and rejects, once a major problem, have been virtually eliminated.

Doors and cabinets enter painting area on a floor conveyor traveling at speeds from 12 to 24 fpm. The conveyor turns the parts as they pass along, allowing the paint to reach all sides. Sides of cabinet shells are painted at the first electrostatic stations, where there are four bells—two on each side of the line. The 4-in. charged bells, controlled by limit switches and rotating at 900 rpm., move up and down, applying the paint uniformly. As different-sized parts pass, the bells automatically move either nearer or further from the work piece—to maintain the proper painting distance. There's no waste of paint. The bells are triggered on and off automatically by electric eyes.

As cabinets move to the second spray station, they are indexed by a specially designed dolly system controlled by an outboard wheel and cam. Backs of the cabinets are painted by one reciprocating unit of three bells. Limit switches again control the distance between bells and cabinets. At the same time, the tops are coated by stationary bells. Then they are indexed to the third station. Some manual touch-up work completes the operation.

The doors are not indexed to the second station, but pass right through to the third station, which is the same as the first.

The paint system was manufactured by Ransburg Electro-Coating Corporation, Indianapolis.



Diagonal supports slash handling time

A W-type steel-shelving support has cut warehouse handling time by one-third at Industrial Metals, Inc., Kansas City, Mo.

The company had a problem in

fork-lifting heavy skids of metal stock from the shelves. With a conventional horizontal support the fork-truck driver could not easily get his forks between the metal bar and the skid. But the diagonal bars give him plenty of room (diagram).

Workers used to stack skids one on top of another, and when a lower item was needed, they had to remove the top skids. With the new method, the single skid resting on its W-shaped support can be hoisted with one thrust of the fork lift.

Invoice dubs as calling card

It often takes a decoding expert to read smudged shipping invoices. But not the invoices from Babcock & Wilcox Company's Beaver Falls, Pa., plant. Its packing lists come in polyethylene jackets, look like calling cards.

With conventional envelopes the packing lists too often arrived oil-soaked and illegible. It meant the packages had to be opened and re-tied to check on the contents.

The polyethylene envelopes are attached to each bundle of tubing sent to a customer. They're virtually oil-proof, so there's no damage when the bundles are dipped in oil for protection in transit. Envelopes are transparent enough for the customer to read the data without removing the list from the bundles.

Keeping bugs away from control panels

Unexpected trouble is always a key maintenance hazard whenever control panels are involved. H. P. Cassel, assistant superintendent of power, The Whitehall Cement Manufacturing Company, Cementon, Pa., suggests these 11 rules to steer you away from trouble when buying or building complex control panels:

1. Experience has shown that no control voltage that's low enough to be completely safe is high enough to provide reliable contact operation in a dusty atmosphere. Best bet may be the traditional 440-volt control circuit.

2. Use multi-conductor control cables—they can be easily tagged for identification by supply source. Grouping cables on logically arranged strips makes it easy and safe to identify voltage sources.

3. Use color-coded wiring for various control voltage levels to make sure the mechanic is aware of the hazard he is facing.

4. Base designs on minimum safe working clearances and use insulating barriers between terminals where potential hazards exist.

5. Tag relays, switches, and fuses according to their voltage source and level.

6. Never allow circuit interlocking that feeds voltage from one source into the load terminals of a circuit on another source.

7. Separately fuse and tag all control circuits with sources in a common control transformer.

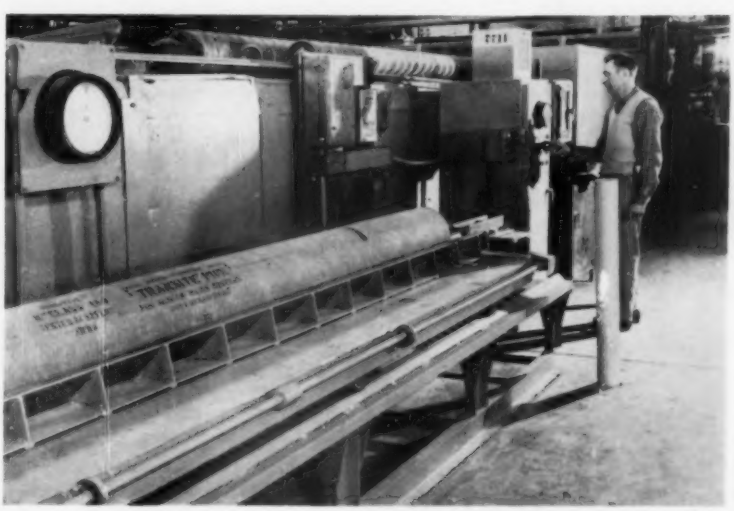
8. Ground one side of all control transformer secondaries.

9. Keep all contacts on individual multiple-contact relays at the same voltage level, where possible.

10. Use conveniences like swing-out panels and drawout instruments —if available—for maintenance.

11. Don't let safety education or enthusiasm lag, even among your most experienced electricians.

Source: H. P. Cassel, Assistant Superintendent of Power, The Whitehall Cement Manufacturing Company, Cementon, Pa.



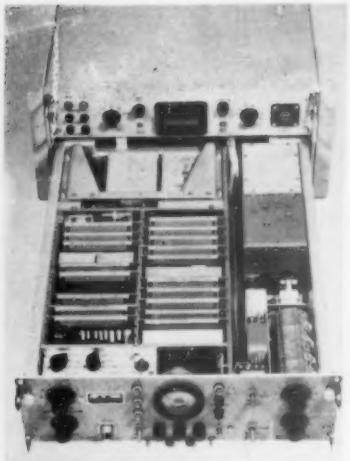
X-ray dopes out pipe width

This electronic gauge keeps track of thickness of asbestos-cement pipe at Johns-Manville Corporation, Manville, N.J. And a strip chart recorder (at right of console) makes a permanent record of wall density for all pipe measured.

The gauge (Daystrom, Inc., Weston Instruments Division, Poughkeepsie, N.Y.) permits non-contact measurements of metallic and non-metallic wall thicknesses.

The test pipe is placed on a motorized carriage controlled by the operator. This moves the pipe over a pencil x-ray beam and a quantity of the transmitted electromagnetic energy is received by a probe within the pipe itself. The quantity of energy varies according to the density of the pipe wall. The probe converts the signal into an electrical impulse, which is transmitted to the floor-mounted console.

The console translates this impulse into percentage deviation of wall thickness from a pre-set zero on a meter. The recorder is then activated by the gauge to make a permanent record of the test.



Trouble-shooting templates

A cardboard template can simplify trouble shooting of complex control panels and chassis in your plant. All you do is trace. Rixon Electronics, Inc., Silver Spring, Md., uses one for data transceivers.

For routine or emergency trouble shooting, the template is placed over the panel and aligned by means of three projecting screws. The maintenance man uses a simple follow-the-arrow procedure, touching the probe input of an oscilloscope to circuit interstage check points in turn. He just compares the trace on the screen to the trace reproduced alongside the check point. If they don't match, he has isolated the malfunction to a specific stage.

Other templates with more detail then narrow the trouble down to the faulty component within that stage.

Corrosion MPs guard industrial equipment

Polyethylene-coated burlap tents provide good protection for stored industrial equipment at the U. S. Army Ordnance plant near Shreveport, La. They eliminate the need to dismantle, grease-coat, and wrap each part of the machine separately to prevent rust and corrosion.

The tents also localize the humidity control area in storage sheds or similar outdoor structures. The actual dehumidification is performed by commercial units, but it's relatively inexpensive since only the tents—not the whole storage area—have to be covered.

Flexibility in size is another feature of the tents. Even after they're installed, changes can be made just by moving the walls, which fold into accordion pleats. The initial tent erected in the plant is 220 feet long, 40 feet wide, 14 feet high at its peak, with 11-ft. walls. There's no problem getting bulky equipment inside—the zipper doors open to 12x10 feet.

Manufactured by Hardin Bag & Burlap Company, New Orleans, La., the tents have ceilings and walls made of 10-oz. burlap, extrusion-coated on each side with a 4-mil film of polyethylene (Eastman Kodak Company, Rochester, N. Y.).

YOU BE THE ARBITRATOR

Continued from page 148

The award: The most important fact, the arbitrator said, was that none of the experimental work was used to fill company orders. Consequently, bargaining unit employees lost nothing by it. "If the company were to begin using the finished sugar produced in this new granulator to fill its orders, or to install the new type granulators throughout the plant and staff them with salaried personnel, the issue would be different."

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony and other facts involved.

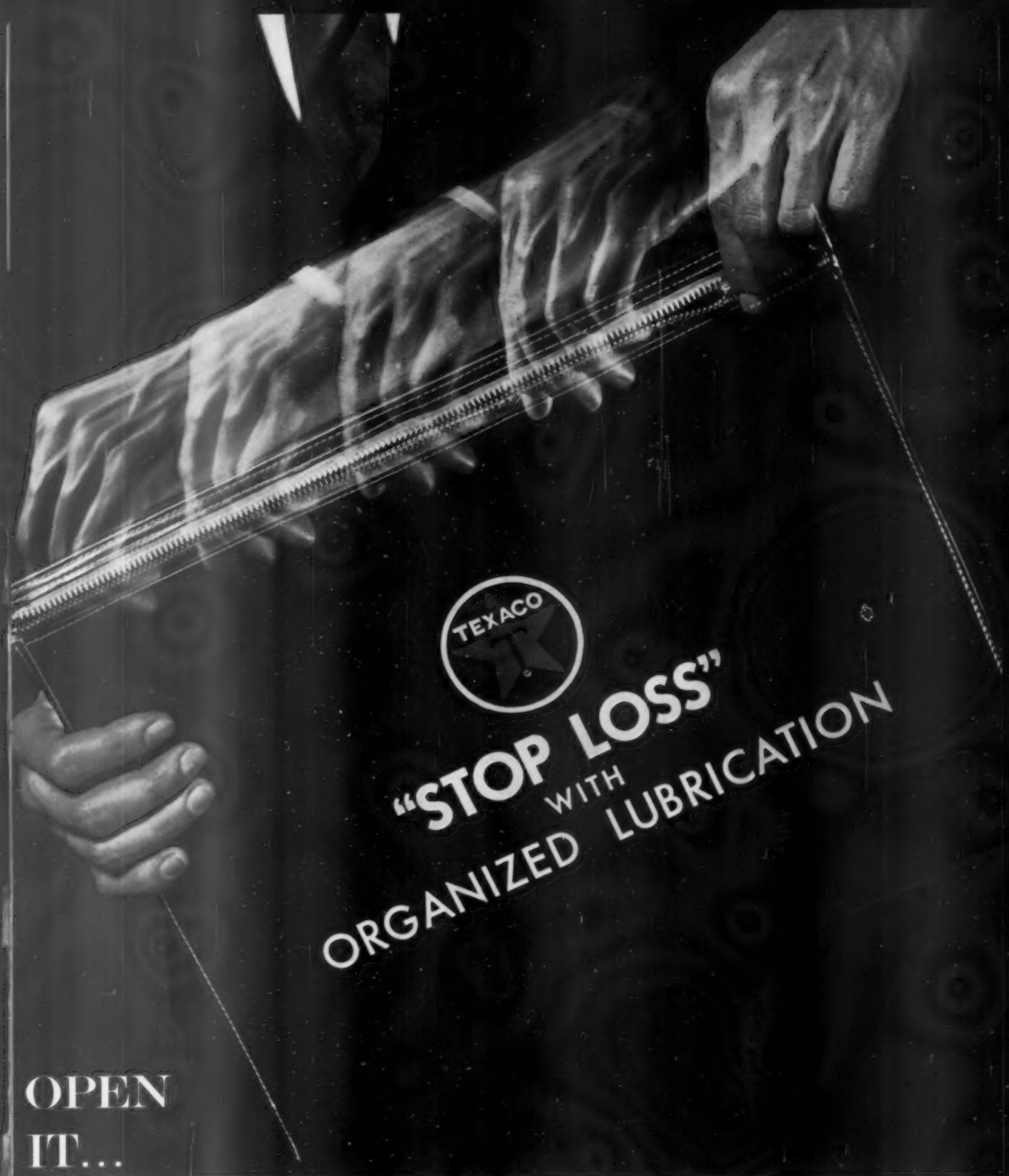
Computer bosses paper machine

A specially tailored IBM 1710 computer will play nursemaid to a 500-ft.-long paper machine at Potlatch Forests, Inc., Lewiston, Idaho.

However, the computer will not provide automatic control. Instead it will cut the time required to gather process variables from 30 to 3 minutes. With 21,000 pounds of paper going through the rolls per hour, a 90% reduction in information-analysis time can greatly reduce production of off-grade paper.

The new equipment will record, store, and analyze process control data from over 200 points, and will continuously report these data in visual form to the operator. Out-of-control spots will be printed in red for instant attention. As the 1710 continues to accumulate data on successful process corrections, it will second-guess the operator when he makes a faulty correction. It will signal him and recommend proper corrective settings.

Management expects to obtain better quality control, a time reduction for grade change, a sharp drop in off-grade product, and a method of recording successful machine settings for application to its other paper machines.



FOR UP TO 4% EXTRA NET PROFIT

In the Texaco man's briefcase is a plan for cost control through organized lubrication—Texaco's "Stop Loss" Program. Management in many different industries is already using it to cut operating costs. The resulting savings go directly into profits. Up 4% is the average. To find out how you can turn excessive costs into profit, write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. F-200

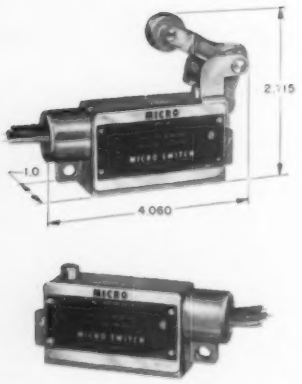
TEXACO

MICRO SWITCH Precision Switches

THESE SWITCHES ROLL WITH THE PUNCH — DON'T GET HURT!

HAMMER-BLOW HERE
Impact actuation of the external plunger is absorbed by a specially designed operating mechanism.

FEATHER-TOUCH HERE
A controlled force is transmitted to the diaphragm-sealed plunger of the internal switching unit.



Plunger Actuator switches and Roller Arm Actuator switches are both available in either left hand or right hand designs.

The MICRO SWITCH "LN" Switches are compact, but rugged! The high-strength enclosure and the special design of the actuator combine to withstand rapid, hammer-blow operation. A diaphragm completely seals the actuating plunger. The No. 14 insulated leads are sealed at the conduit hub. A gasket inside the cover completes the seal against oil and dust.

Two contact arrangements are available: single-pole double-throw and two-circuit double-break units. Check the compact size and you'll find that "LN" Switches fit where other switches can't! See the Yellow Pages for the nearby MICRO SWITCH Distributor or write for Catalog 83.

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Sales and service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.

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MICRO SWITCH Precision Switches

For more facts circle 486 on Reader Service Card

IDEAS OF THE MONTH

By Lewis K. Urquhart, Consulting Editor, FACTORY

For more data, circle item numbers on Reader Service Card next to back cover.

Two mathematical techniques—multiple regression analysis and linear programing—are reviewed in new report (*Bendix*). They're examples of effective use of data processing systems as tools to provide information needed to reduce overhead costs, inventories, production waste. **(236)**

Looking for new plant sites? See brochure (*American Electric Power System*) on plant location "in the heart of industrial America." **(237)**

Slotted angle now comes in kits (*Acme Steel*), all parts cut to length, all assembly hardware provided. Line includes 120 storage units, 17 workbenches, 13 tables plus foreman's desk, 27 regular and heavy-duty carts. **(238)**

Hazard hunting—how to stalk, kill, skin, stuff, and mount family accidents—is newest booklet (*National Safety Council*) designed to promote off-the-job safety. One look at sample copy (free, of course) and you'll want to mail this easy-to-read 10-pager to employees' homes. **(239)**

No more refiling! Not with Electrofile (*Acme Visible*) which seems to be close approach to 100% automation in filing and finding data. Yet operator can produce any card with just the touch of a finger on the keyboard. After use, cards can be put back at random anywhere in the file. Operator uses same keyboard to code new cards by any classification—all in a jiffy. **(240)**

If you feel you can't do without "some down-to-earth footnotes on the space age" (and who doesn't?), permit us to recommend a delightfully written and illustrated booklet (*Aerojet*). Fine hot-weather fare. **(241)**

Been thinking the value of disposable shop towels is limited by their short life? Then now's the time to try Kimtowels (*Kimberly-Clark*). Because they are both disposable and re-usable, hold up through many a wipe. **(242)**

Plastic-sealed safety tags (*Idesco*)—the kind that say "Danger, men working in boiler" or "Do not throw switch"—resist wear, tear, dirt, moisture. Satin finish permits pencil writing, erasing over and over again. **(243)**

Flooring problems? Who hasn't? That's why your maintenance department's library should include "Manual of Underlayments and Floor Resurfacing Materials" (*Allied Compositions*). Which to choose. How to apply. **(244)**

Coffee looks like coffee in new toast-brown plastic cups (*Scott*). None of that greenish-yellow tinge often noted in paper cups. **(245)**

Turn the page

For more data, circle item numbers on Reader Service Card next to back cover.

EDP—the first 10 years—is meaty brochure (*McKinsey*) that highlights experience with electronic data processing, provides look-ahead to developments in computer technology and computer-aided management, points up what management can do *now* to keep abreast of advances in field. **(246)**

Well-dressed young men who have to handle liquid oxygen and nitrogen are wearing protective suits (*American Optical*) of nylon cloth that's static-resistant, flameproof. In translucent white and green. Hood fits over hard hat. Special boots and dehydrated cowhide gloves complete costume. **(247)**

It's a coupling. It's a valve. At price of coupling alone. That's what maker (*Stile-Craft*) claims for Dyna-Con pneumatic coupling. **(248)**

How about a cool green parking lot? You can have it with synthetic bitumen (*Velsicol*) that can be applied to new or old asphalt or concrete pavement. Other colors: red, blue, yellow. Also neutral and white. **(249)**

Roller chain users, present and prospective, will find plenty to chew on in new catalog (*Acme Chain*) with its 106 pages of power transmission plans and ideas. Engineering section contains 35 methods of adjusting chains on movable-sprocket and fixed-sprocket center drives. **(250)**

With Huge Haul detachable container system (*Heil*) one truck "becomes a fleet." Stores, picks up, carries, dumps materials. **(251)**

Sweat gets in their eyes? 'Twon't with sweatbands (*General Bandages*) of expanded cotton that's so absorbent they hold up to 10 times their weight in moisture. Wonderfully comfortable with helmet or goggles. **(252)**

When clothing catches fire, fire blanket (*Mine Safety Appliances*) snuffs out flames. It's 62x82 in., packaged in vertical case. Victim pulls rope. That opens doors, permits pleated blanket to move forward as victim revolves, wrapping himself tightly from head to foot. **(253)**

Circuit breakers or safety switches? If you're not already enrolled on the right side, read 32-page comparison guide (*Westinghouse*) which supplies costs, sizes, installation information, etc. **(254)**

Speaking of circuit breakers, one easy way to choose model you need is to twirl dials of handy-dandy selector disk (*Westinghouse*). **(255)**

Weeskacfaacp stands for nothing but "what every engineer should know about crystal filters at a cocktail party." So, if you're an engineer with an inquiring mind, you'll want 12-page brochure (*Electro-Products*) which enables you to "startle listeners with a profound, witty, knowledgeable remark, and never get invited again." **(256)**

Turn the page

Cat Wheel Loaders prove themselves on the job

WHEREVER THEY WORK—WHATEVER THEY DO...CAT WHEEL LOADERS ARE GETTING THE WORK DONE QUICKLY, ECONOMICALLY, SAFELY

Broad River Brick Co., Gaffney, S. C.—Cat 944 Wheel Loader scoops up a full bucket of brick clay for hopper charging. "Our 944 is fast, maneuverable and easy to operate," reports the assistant plant manager, who measures machine features in terms of daily performance... and is well satisfied.

Great Western Sugar Co., Scottsbluff, Nebraska, uses a Cat 966 to truck-load stockpiled beets for processing at the local plant. With a special 6-yd. bucket, the big Caterpillar 966 loads 1500 tons of beets daily from various stockpiles over the Scottsbluff Valley.

• Three Sizes: 922 – 80 flywheel HP (105 HP max.), choice of gasoline or Cat Diesel Engine; 944—105 flywheel HP (135 HP max.), choice of gasoline or Cat Diesel Engine; 966 – 140 flywheel HP (205 HP max.), Cat Diesel Power.

• Bucket Sizes from 1¼-2¾ yd. with special buckets, including side dump, and forks always available from the Cat Dealer.

• Power Shift Transmission – fast response, smooth on-the-go shifting at the touch of a finger.

• Automatic Bucket Positioners—speed cycles. One touch on lift lever raises full bucket to dumping height and *holds* it. Another touch on tilt lever automatically positions bucket at the correct digging angle. Operator is free to maneuver loader.

• Easy On-and-Off Design – operator mounts machine via three steps. He sits *behind* the lift arms and has visibility all around. This safety gives him confidence, speeds the work.

• Diesel Fuel Range—Cat Diesels use the heavier, lower-cost, high-energy No. 2 furnace oil – as well as the premium grades.

• Live-Action Hydraulics – for fast-acting bucket and lift movements with high lift capacity. Pump is driven direct from engine, keeps hydraulics fast regardless of load on drive wheels.

• All-Weather Starting – with independent gasoline starting engine available on all diesel models. Direct electric key starting is standard.

• Dual Braking – one brake neutralizes the transmission as it stops the machine, transferring extra power to the bucket, assuring full loads in tough material. Right brake pedal stops machine with transmission engaged... for full control.

Your Caterpillar Dealer will gladly show you these machines, their many features and how they can be tailored to your needs. See him soon. Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

For more facts Circle 487 on Reader Service Card

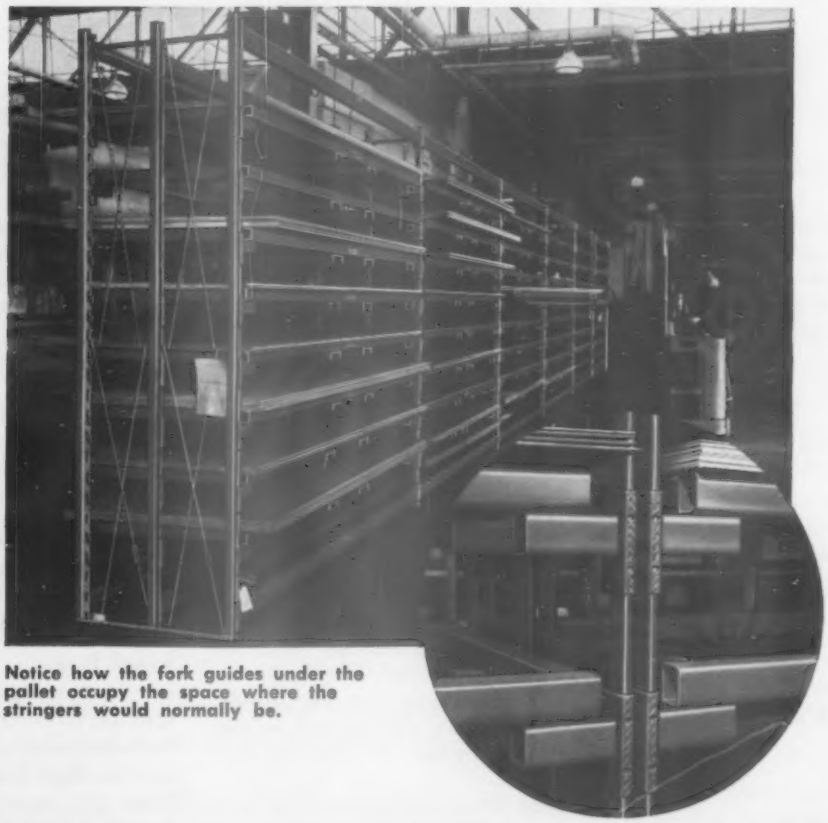
another *American* "first" an innovation in

adjustable STORAGE RACKS

for sheet metal and other flat materials

Here's a rack that's a must for all warehouses that store flat sheet materials. By eliminating the full-length stringers (except at the top and bottom levels where they serve as tie bars), valuable space is saved, thereby providing more productive storage space in the same area. The material is stored on a special pallet made of rugged, continuous welded square tubing. The pallet is supported on short non-bolting cantilever arms that can easily and quickly be raised to any level, on SLIDE-N-LOCK posts (see inset). Each upright frame has 3 posts so that the special tubular pallet is supported at 6 places, assuring maximum stability and a greater safety factor. Another American money-saving, space-saving contribution to modern, efficient warehousing.

send today for catalog



Notice how the fork guides under the pallet occupy the space where the stringers would normally be.

AMERICAN METAL PRODUCTS COMPANY

STORAGE RACK DIVISION

5965 Linsdale Ave. amp® Detroit 4, Michigan

Manufactured in Canada by Sunshine-Waterloo Co., Ltd., Waterloo, Ontario

For more facts Circle 488 on Reader Service Card

For more data, circle item numbers on Reader Service Card next to back cover.

Washing lighting fixtures is no longer a sloppy, time-consuming job for maintenance men with portable, self-contained machine (*Wash-A-Matic*). It automatically applies wetting agent, detergent, brushing, rinse spray, and destaticizer. Fast, on-the-spot cleaning with nary a splash. **(257)**

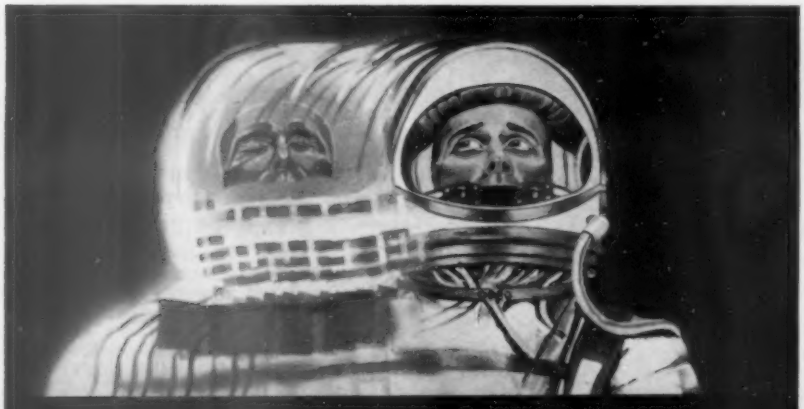
No safer ladder (we opine) for working around live wires than Fiberglas-reinforced plastic job (*American Allsafe*) with polyurethane core. Nonconductive, of course. Will support 2000 lb. No-slip feet. **(258)**

Shutdown Master Planner is 22 x 17 wall chart (*Westinghouse*) that helps you schedule equipment shutdown maintenance activities. **(259)**

39 examples of how rubber-faced steel plate is saving maintenance dollars in wide variety of industries. A 24-pager (*Gates Rubber*). **(260)**

Particle Poop is informal (that's for sure) monthly newsletter (*Gelman*) devoted to discussions of air sampling and radioactivity measurements. Maybe your safety engineer should be on mailing list. **(261)**

Turn the page



FORCES FOR CHANGE

National Training Laboratories Announces its 1961-1962 Programs for INDUSTRIALISTS

KEY EXECUTIVE CONFERENCES
for high level management only

Session II (5th annual program)
September 4-15, 1961
NTL Conference Center
Bethel, Maine

Session I (6th annual program)
January 21-February 2, 1962
Onchiota Conference Center
Sterling Forest, Tuxedo, New York

MANAGEMENT WORK CONFERENCES
for corporate executives, department heads, and staff men

Sessions I, II, and III (7th annual program)
October 29-November 10, 1961
January 21-February 2, 1962
March 18-30, 1962

Arden House
Columbia University's Harriman Campus
Harriman, New York

Forces for change—whether from **automation**, the **population burst**, shattered smugness about **international competition**, or from other directions—all are creating new and difficult problems of human management in today's business . . . . . **NTL**, in its unique, world-renowned programs of management development, with tested application over 15 years, has for its aim the improvement of the abilities of American business executives to deal with the problems of change . . . The faculty is chosen from the leading research and training centers in this country which are concerned with modern organizational problems. Literature upon executive request. **National Training Laboratories** (a non-profit organization), **National Education Association**, 1201 - 16th St., N. W., Washington 6, D. C.

For more data, circle item numbers on Reader Service Card next to back cover.

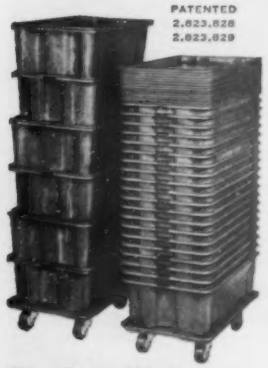
Insulation resistance record card (*Associated Research*) helps anticipate electrical equipment failures. You measure resistance at regular intervals, enter readings on card, get curve of insulation deterioration. Sudden drop in curve gives advance warning of trouble to come. **(262)**

Mounted wheel selection guide (*Bay State*) will help you pick bond, shape, grit, and grade you need to cut your metals and your costs. Its 36 pages include see-at-a-glance chart of standard shapes. Also complete rundown of maximum safe operating speeds for all shapes and spindle diameters. **(263)**

Plant safety marking is outlined in new brochure (*Sherwin-Williams*) which shows samples of six generally accepted safety marking colors, and explores application to hazards most frequently encountered. **(264)**

Industrial drilling service (*Geo-Drill*) will drill holes from ¼-in. to 20-in. diameter through reinforced concrete—with diamond bits. No dust, no noise, no chipping or cracking. Drilling is fast, up to 2 in. per minute. Holes up to 100 ft. long can be accurately controlled. **(265)**

Lewis Containers SOLVE EVERY HANDLING PROBLEM

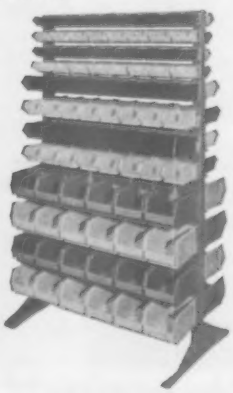


Stack-n-Nest®
TOTE PANS

Only Lewis Stack-n-Nest tote pans stack and nest, within their own dimension, without any mechanical gadgets. Molded in one piece of Fiberglass reinforced polyester . . . can't dent, rust, rot or warp. Available in 9 sizes from 16"x10"x5" to 34"x24"x19", in grey, green, and red. Accessories include pan covers and 4-caster dollies. **Shipment within 24 hours from receipt of order.**

PLASTIBOX UNITIZED ASSEMBLY CONTAINERS

One piece, molded plastic. Strong, smooth, non-corrosive, easily cleaned. Stack securely and afford maximum storage of parts; 4 sizes in green or yellow. Accessories are available for a wide variety of bench or wall mounting. Truck assembly allows boxes to be quickly moved. **Shipment within 24 hours from receipt of order.**

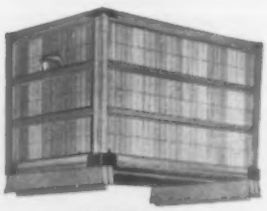


PolyLewton
FOOD HANDLING PANS

Stack-n-Nest pans are available in this remarkable material developed for raw food handling. The glass-like surfaces are easily cleaned, have no crevices to harbor bacteria. Inside dimensions are 20"x12"x8", weigh 3¾ lbs., handle up to 50 lbs. **Shipment within 24 hours from receipt of order.**

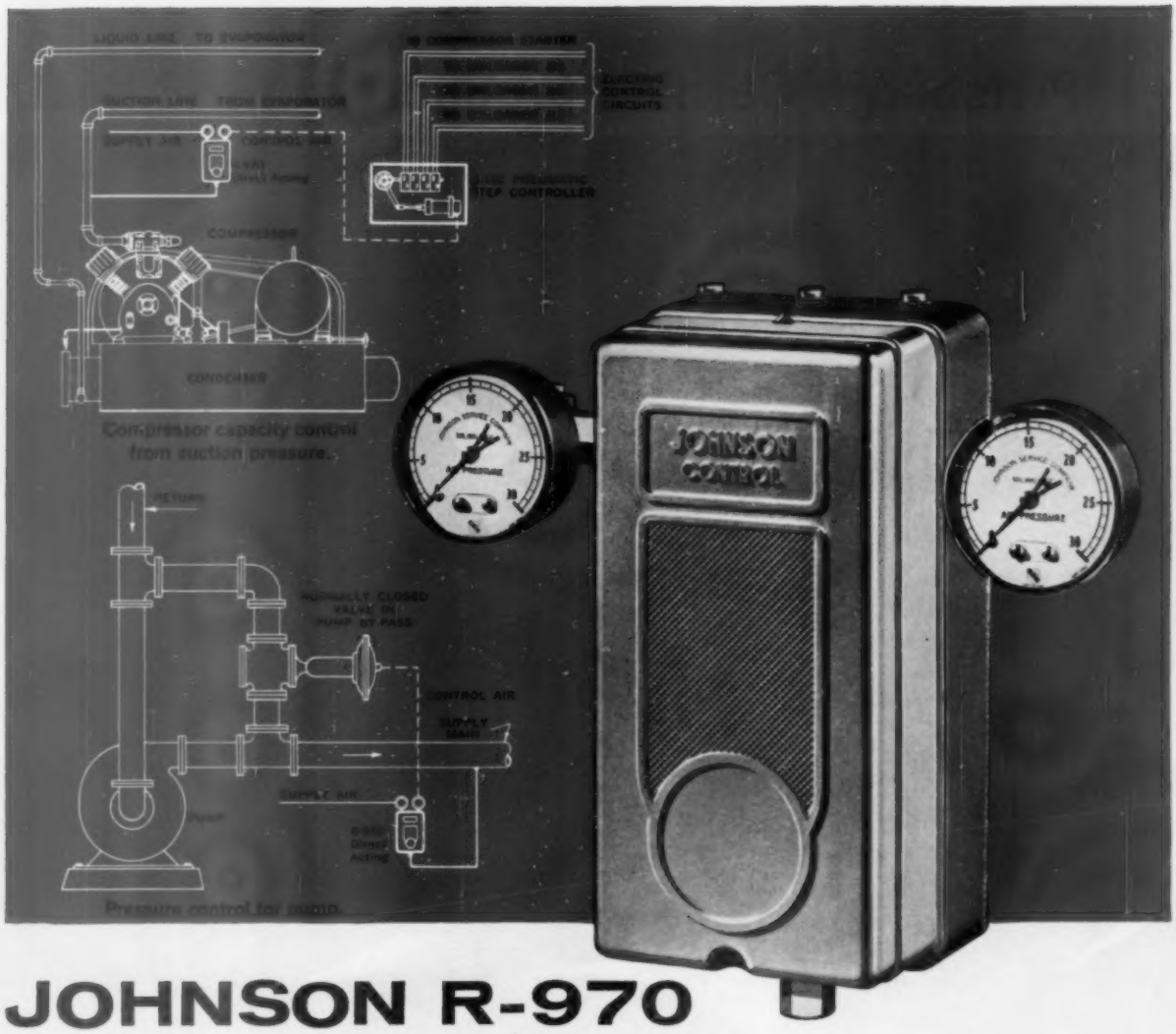
WOVEN WOOD-and-WIRE HANDLING CONTAINERS

Tough, resilient wood-and-wire webbing is combined with a select hardwood frame, jointed at corners and reinforced with steel corner irons . . . here are husky, long-lived, big capacity containers available in many sizes and styles, including trucks and collapsible boxes. Designed for single or multiple handling with modern handling systems and equipment. **One to three week delivery.**



WRITE TODAY for illustrated brochures on the complete Lewis material handling container line.

G.B. Lewis COMPANY
128 Montgomery Street, Watertown, Wisconsin



JOHNSON R-970

pressure regulator

for air, steam, freon, water, and other liquids

- Adaptable to a wide range of pressure-control problems involving compressors, condensers, pumps, valves, and other equipment.
- Interchangeable pressure elements available in two ranges: −30" Hg. to 25 psi and 0 to 250 psi. Equipped with calibrated dials for control point setting and sensitivity adjustments.
- Linear response results in uniform dial calibrations and sensitivities over entire operating range.
- Follow-up movement, or "pneumatic sensitivity," assures extreme accuracy of control.
- Proportional action; simple change of pivot converts from direct to reverse acting.

For complete information, write for bulletin R-970. Johnson Service Company, Milwaukee 1, Wisconsin. 110 Direct Branch Offices.

JOHNSON CONTROL

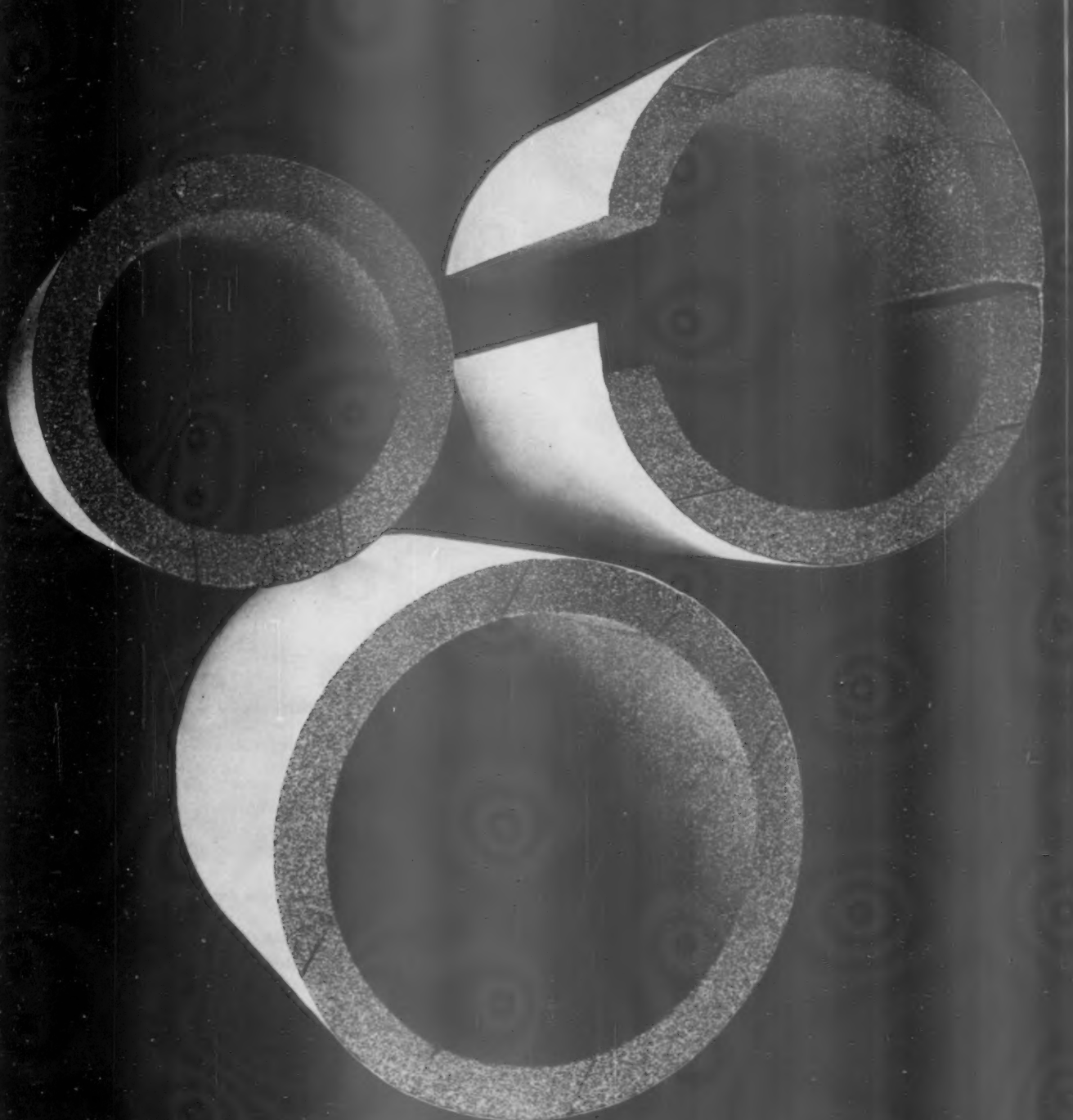
PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

For more facts Circle 491 on Reader Service Card

For items on page 163, circle 492 for pipe insulation, 493 for glass blocks, 494 for insulation

Pittsburgh Corning products control heat,

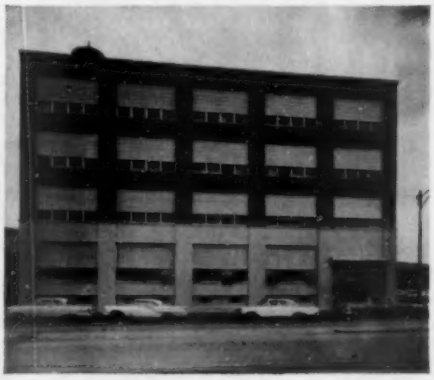


light, & sound to make your buildings better . . .

consider these examples:

the need: a pipe insulation that stays dry, stays rigid and firm on the longest vertical or horizontal runs.

the product: FOAMGLAS Stay-Dry Pipe Insulation is a cellular glass pipe covering that is impervious to water or moisture, guarding against corrosion and pipe hanger failure. Its high compressive strength and dimensional stability protect high piping runs without maintenance. It's factory-wrapped with a dual-purpose kraft aluminum foil laminate jacket available in 1″ and 1½″ thicknesses for pipe sizes from ½″ to 6″ I.P.S.

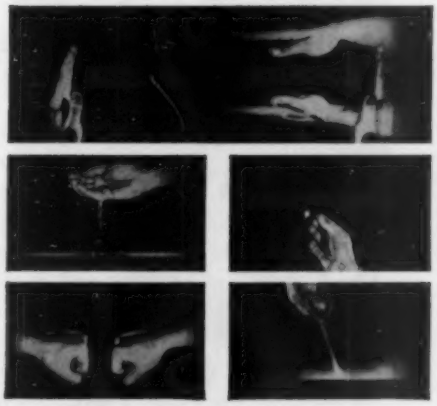


the need: a light-transmitting window modernization material to keep heat in, dirt out, and cut maintenance costs up to 30%.

the product: PC Glass Blocks admit diffused light, free from glare, offer an attractive exterior and a private interior. Unlike common sash that takes constant cleaning and repair, Glass Blocks are air-tight and eliminate rusting, rotting wood or metal sash. Find out how much you can save in your plant or office. Mail the coupon for our survey form.

the need: an all-purpose insulation that stays effective, eliminates replacement on roofs, walls, piping or equipment.

the product: FOAMGLAS® Insulation provides these important insulating benefits: rigid and dimensionally stable; completely moistureproof; cannot burn; vaporproof without an extra vapor barrier; and strong enough to support 7 tons psf, av ult. Whatever your application, building or industrial, FOAMGLAS can provide constant insulation for the life of the equipment it protects.



Pittsburgh Corning Corporation, Dept. FF-81, One Gateway Center, Pittsburgh 22, Pennsylvania
(In Canada: 3333 Cavendish Boulevard, Montreal, Quebec)

Please send me the PC product data checked below:

- ☐ FOAMGLAS-BOARD™
- ☐ FOAMGLAS Roof Insulation
- ☐ PC GLASS BLOCKS
- ☐ The PC 4 x 12 Block
- ☐ PC Color Glass Blocks
- ☐ GEOCOUSTIC® Acoustical Absorbers
- ☐ FOAMGLAS Low Temperature Insulation
- ☐ FOAMGLAS Insulation for Industrial Piping
- ☐ FOAMGLAS Stay-Dry Pipe Insulation
- ☐ FOAMTHANE™ Polyurethane Insulation
- ☐ FOAMGLAS Insulation for Curtain Wall Panels
- ☐ PC Sculptured Glass Modules

Name_____

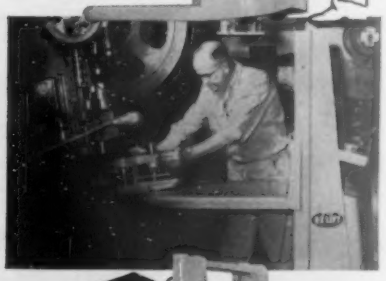
Company_____ Title_____

Address_____

City_____ Zone____ State_____

PITTSBURGH PC CORNING

54* by Crown
VALUE PRICED!



*Send for free catalog of 54 Models.

CROWN
CONTROLS CO., INC.
TORY AVENUE
NEW BREMEN, OHIO
MATERIAL HANDLING DIVISION

CATALOG NEWS

For more data, circle item numbers on Reader Service Card next to back cover.

ELECTRICAL

1—Metal-clad switchgear. Two bulletins: GEA-5664F (42 pages) gives features, installation, and other data. GEA-7190 (8 pages) provides information on outdoor enclosures used with metal-clad switchgears. *General Electric Co.*

2—Transformers. Compact 50/60-cycle variable transformer series with output ratings to 3.75 amp. is subject of 8-pager (P6121). Design innovations: gold alloy-plated commutator; adjustable solid metal shaft. *Superior Electric Co.*

3—Lighting ballasts. Here's an informative bulletin (FL-370A, 12 pages) with electrical, mechanical specifications, operating voltage, and frequency data for indoor and outdoor fluorescent lighting ballasts. *Sola Electric Co.*

4—Emergency lighting. This handy-sized booklet, "The Odds on Emergency Lighting," shows what happens in a power failure blackout and how the risks can be avoided. Includes installation diagrams and cost figures. *Electric Cord Co.*

5—Motors, generators, controls. Bulletin E100P (48 pages) is a revised "Catechism of Electrical Machinery." It presents important theoretical and practical features of common types of d-c and a-c motors. *Fairbanks, Morse & Co.*

6—Switches. Specifications and other details on low-pressure and velocity-actuated flow switches are contained in useful 30-page bulletin. Covers other products, such as flow meters, manometers, air filter gauges, and the like. *The Henry G. Dietz Co., Inc.*

7—Pump motors, drives. Bulletin F-2002 is a comprehensive 20-pager on all of maker's products in the pumping field. Data will help you select the optimum motor or drive for specific applications. *U. S. Electrical Motors Inc.*

8—Switchgears. Two catalogs: F-1700B (16 pages) gives step-by-step analysis of functions of fused interrupter components, with application requirements. F-1700D (24 pages) shows construction, other features. *I-T-E Circuit Breaker Co.*

9—Switches. Description and dimensional drawings are contained in Catalog 201 (12 pages) on Loxswitch Model LI00W heavy-duty switches. Shows special-purpose switches such as remote control, air-operated, plug-in. *R. B. Denison Mfg. Co.*

AUXILIARY

10—Pumps. Bulletin 725.1 (16 pages) discusses mechanical reliability, interchangeability of units and parts, and other advantages of single-stage centrifugal pumps. Specifications, frame selection tables, sizes. *Goulds Pumps, Inc.*

11—Electronic air cleaners. This 16-pager (258B) describes new self-contained high-velocity precipitator for inaccessible areas and for air-handling units. In 24 sizes from 1000 to 25,000 cfm. *American Air Filter Co., Inc.*

12—Water-cooling towers. Space, weight, and time-saving characteristics of CompacTowers are set forth in this illustrated 6-page bulletin (CT-61). Towers come in two easy-to-join subassemblies. Capacity table. *The Marley Co.*

13—Boilers. Bulletin No. 549B (8 pages) covers Square-Heat Type R series for heating medium-size buildings. Specifications, ratings, dimensions for these three-pass boilers. In 12 sizes. Photos. *American-Standard Industrial Div.*

14—Roof ventilators. Specifications, dimensions, and performance data on four types of propeller fan-powered ventilators are given in Bulletin A-112E (16 pages). Also covers other equipment. Drawings. *Hartzell Propeller Fan Co.*

Turn the page

MAIL the coupon for latest Safety Switch Bulletin

Square D Company, Dept. SA-102
1601 Mercer Road, Lexington, Kentucky

Please send me your latest SAFETY SWITCH BULLETIN

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

THE ONLY COMPLETELY SAFE SAFETY SWITCH HAS VISIBLE BLADES!

Square D gives you Safety you can See!

• The men who pull the switches will tell you what can happen when a switch, *believed* to be open —*isn't*. A lot of things can happen—and every one of them is bad. Personnel safety is in jeopardy. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on Visible Blade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages? Evidently it does, because *Square D switches have never been out of first place in more than 50 years!*

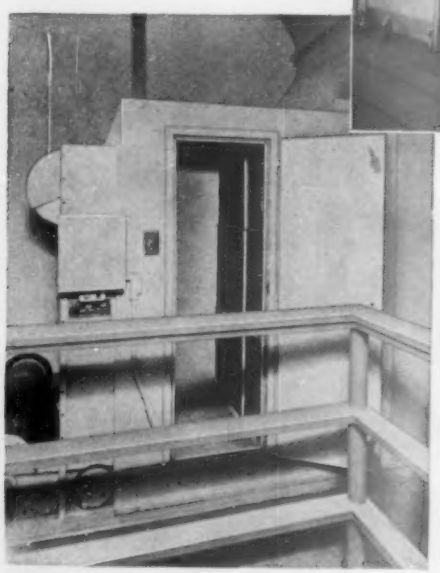
They cost no more...why settle for less?

SQUARE D COMPANY

wherever electricity is distributed and controlled

HOW CONNOR dorex® Protects EXPENSIVE EQUIPMENT AGAINST CORROSIVE GASES

At the Linden Generating Station of Public Service Electric and Gas Company, Newark, New Jersey, Dorex Air Purification equipment protects the collector rings of the station's large generators from corrosive gases.



Two Dorex installations of six cells each prevent a destructive condition which would cause frequent, costly replacement of brushes and rings.

And in many other utility stations and industrial plants, Dorex guards expensive equipment against such destructive, contaminated gases as sulfur components, organic peroxides, nitrogen oxides, and chlorides . . . and protects personnel.

Dorex acts just like a gas mask, using activated carbon to adsorb air-entrained pollutants. The carbon's purging action purifies the air and readies it for sanitary re-use. Dorex is easily adapted to new or existing duct systems, requiring no more engineering than that necessary for similar incorporation of standard dust filters.

Request new Dorex Bulletin 108A, and ask to have a Dorex representative call . . . Dorex equipment can be the efficient, economical solution to your air pollution problem.

CONNOR... for Constant Comfort Conditions

CONNOR ENGINEERING CORPORATION

DANBURY • CONNECTICUT

CONNOR ENGINEERING CORPORATION dorex® air recovery

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

15—Rotary pumps. Here's an informative 16-pager that presents maker's Series 3600 pumps. Shows bedplate-mounted, gasoline engine, and electric motor-driven units. Performance tables, dimensional drawings. *Roper Hydraulics, Inc.*

16—Flooded-bed scrubber. This 4-pager describes the unique principle of operation employed in scrubber to eliminate fumes, mists, vapors, and light dusts from processing gases. Includes dimensions, applications. *The John Wood Co.*

17—Pumps. Bulletin No. 143 (4 pages) provides details on two easy-access single-stage, double-suction pumps. Type DS is water-cooled unit in 22 sizes. Type DL is air-cooled unit, 13 sizes. Selection chart. *Pacific Pumps, Inc.*

PIPES, VALVES, AND FITTINGS

18—Valves. Catalog 10-B is a revised 16-pager with condensed descriptions and specifications on R-P&C bronze, iron body and cast steel gate, globe and angle, check valves; bar stock valves, others. *American Chain & Cable Co., Inc.*

19—Teflon hose. Reliability, long life, and wide-temperature range are features discussed in 4-pager (S603). The three-layer hose is made of Teflon tube, braided wire carcass, and neoprene cover. Many applications. *Hewitt-Robins.*

20—Hose fittings. This 6-pager (651) describes new type of detachable, re-usable fitting for high-pressure hose assemblies. The three-part Iron Mike fitting is easy to assemble, install. Ten end-fitting styles. *Aeroquip Corp.*

21—Stainless steel fittings. Here's a 36-page catalog with information about wide variety of fittings—forged, cast, or machined from bar

EASE THE PROFIT SQUEEZE WITH AN AUTOMATIC® GAS LIFT TRUCK

A truck that's down for repairs costs plenty. So does one that gulps fuel. AUTOMATIC's answer: a truck with no clutch to shift or wear out, no complicated torque converter to breakdown . . . a truck that saves you up to 30% on fuel . . . and yet costs no more to buy.

With as many as 200 fewer wearing parts compared to conventional power shift units, the danger of unexpected downtime is practically eliminated. So is the cost of complex and frequent repairs. An AUTOMATIC *gas* truck means less maintenance . . . easier maintenance.

Cutting fuel bills, while at the same time increasing output, is another profit-saver. AUTOMATIC's high efficiency transmission gives higher torque while moving more tonnage per hour with less fuel.

Check initial cost. AUTOMATIC's gas lift truck is priced competitively to all other trucks of the same capacity equipped with automatic transmission.

It's a sound formula to combat the profit squeeze: save on initial cost, save on maintenance, save on operating costs.

Capacity with cushion rubber tires, 3000 to 10,000 lbs., pneumatic tires, 3000 through 8000 lbs.

AUTOMATIC

AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale & Towne Manufacturing Company
39 West 87th Street, Dept. M1, Chicago 20, Ill.

FIRST IN IMAGINATION
FIRST WITH REALITY

WRITE FOR DESCRIPTIVE LITERATURE

Please send full details on Automatic Gas-Operated Lift Trucks:

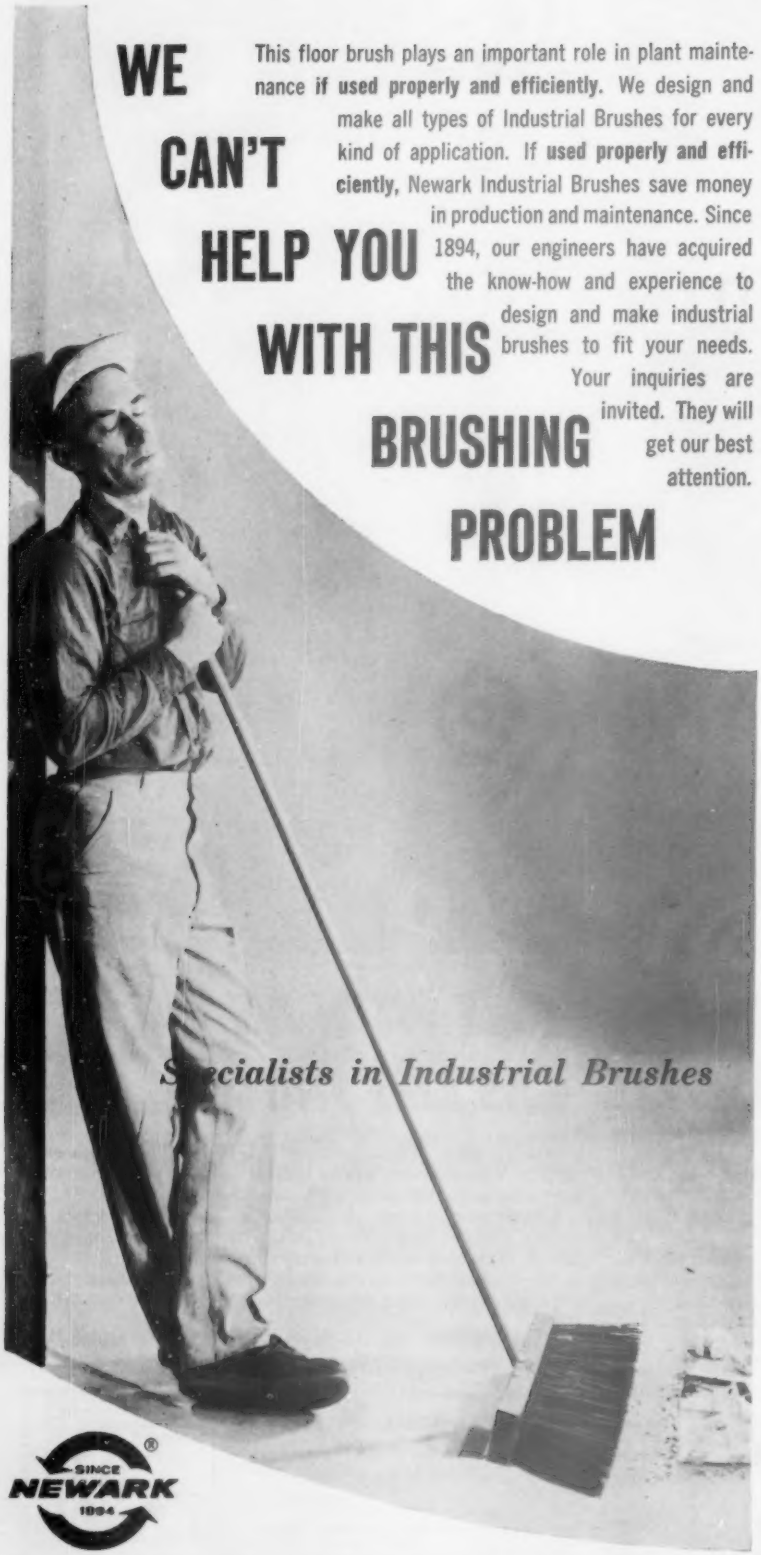
Name_____

Firm_____

Address_____

City_____ Zone_____ State_____

For more facts Circle 498 on Reader Service Card


WE CAN'T HELP YOU WITH THIS BRUSHING PROBLEM
This floor brush plays an important role in plant maintenance if used properly and efficiently. We design and make all types of Industrial Brushes for every kind of application. If used properly and efficiently, Newark Industrial Brushes save money in production and maintenance. Since 1894, our engineers have acquired the know-how and experience to design and make industrial brushes to fit your needs. Your inquiries are invited. They will get our best attention.
Specialists in Industrial Brushes
SINCE NEWARK 1894

Leadership Proved Through Performance! 59-54

NEWARK BRUSH COMPANY
260 MICHIGAN AVE., KENILWORTH, N. J.

For more facts Circle 499 on Reader Service Card

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

stock—for service at from 150 to 6000 psi. Specifications, applications. *Cooper Alloy Corp.*

22—Flexible metal hose. Catalog 600 (32 pages) is an illustrated guide to help you select the right hose for specific installations. Covers problems of non-steady pressures, elevated temperatures, and the like. *Atlantic Metal Hose Co.*

23—Tube fittings. Features, advantages, applications, and other data are given in compact reference booklet. Discusses the advantages of maker's O-Ring Seal with separate split-ring grip fittings. Photos and drawings. *The Lenz Co.*

MATERIAL HANDLING

24—Lifting equipment. This 24-page material-handling manual features 59 ways to lift, load, position, and machine-feed more efficiently. Detailed studies show how hydraulic power is used to cut costs, etc. *Globe Hoist Co.*

25—Belt conveyors. Booklet "For All-Round Use" (8 pages) illustrates applications and features of steel conveyors. Data on handling different materials on the same band. *Sandvik Steel, Inc.*

26—Pulleys. Bulletin 1160 (8 pages) describes new one-piece steel pulley with spun-end construction. End-plate weldments have been eliminated in the fabrication of these pulleys. Load-rating chart. *Stephens-Adamson Mfg. Co.*

27—Weighing systems. Two catalogs: No. 2490a (4 pages) discusses advantages of automatic bulk-weighing systems. No. 2968a (8 pages) tells about checkweighers that provide 100% in-line, in-motion inspection. *Toledo Scale Corp.*

28—Conveyors. Details on medium-duty conveyors with aluminum rollers and nylon bearings are given

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

in 4-page bulletin. Portable and easy to install in conveyor lines with a simple hook and bar coupling. *Harry J. Ferguson Co.*

29—Storage racks. Here's an 8-pager (No. 107A) on system with two basic parts—upright frames and stringers. Welded in jigs, needs no tools, bolts, screws to erect. *Bernard Gloekler North East Co.*

30—Marking methods, machines. This 6-page brochure is titled "Helping Your Product Speak for Itself." It stresses the importance of legible, complete, low-cost marking, identifying, or decorating of products. *Markem Machine Co.*

INSTRUMENTS AND CONTROLS

31—Recording instruments. Catalog No. 625 covers recording and controlling instruments for temperature, pressure, humidity, other uses. Has guide for determining thermal systems, diagrams of installations. *Weksler Instruments Corp.*

32—Load cell systems. Bulletin R-2 (12 pages) illustrates uses of remote indicating systems, compares new differential transformer principle with other designs. Compression, tensile, and push-pull models. *W. C. Dillon & Co., Inc.*

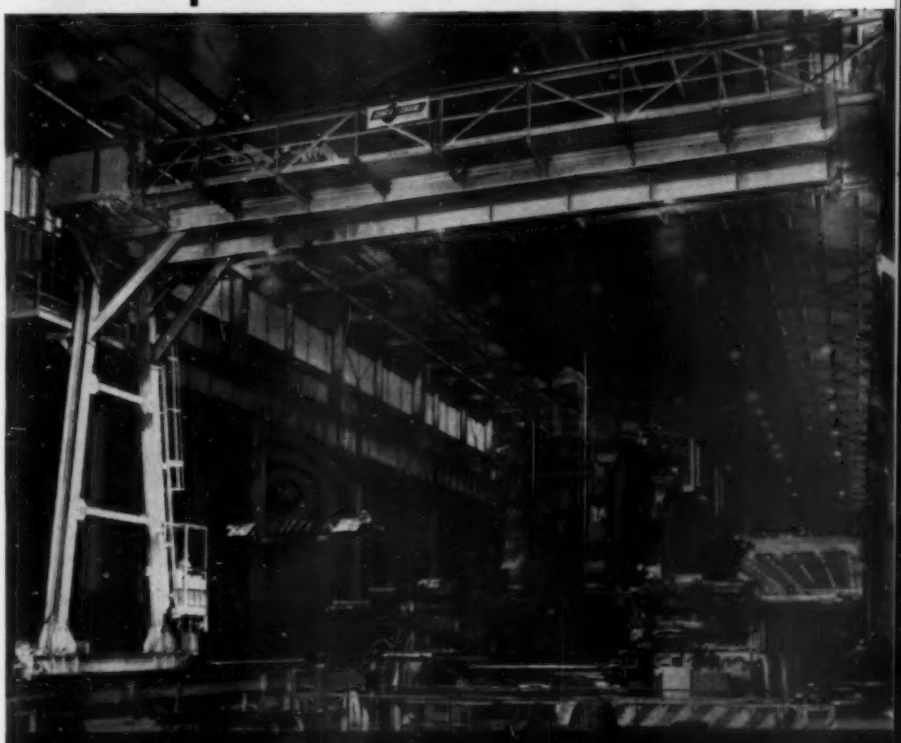
33—Test gauges. Testing equipment for checking and calibrating pressure instruments is described in 8-pager (363). Products include master reference, pocket and vacuum, other test gauges and pumps. *Manning, Maxwell & Moore, Inc.*

34—Gauges. This 32-page catalog (DH54) contains construction and operation details on Helicoid pressure vacuum and compound indicating gauges. Covers various types of cases, dials, and movements. *American Chain & Cable Co., Inc.*

Turn the page

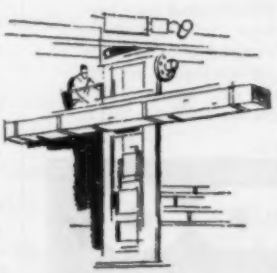
CONCO OVERHEAD TRAVELING CRANES

in capacities to 150 tons



Conco Semi-Gantry Crane custom-engineered for service in a Chicago area steel mill

CRANES HOISTS CONCO



Write for Crane Specifications Tablet containing five sets of general service crane specification data and forms.

For information on Conco Cranes, Hoists and Trolleys Request Bulletin 50008

Material Handling Division
CONCO ENGINEERING WORKS, INC.
Mendota, Illinois

AFFILIATES:
SPARTAN TOOL DIVISION, Powered Sewer Cleaning Equipment
FIELD CONTROL DIVISION, Barometric Draft Controls
CONCO BUILDING PRODUCTS, INC., Brick, Tile, Stone.

CHICAGO TRAMRAIL, manufacturer of "Trak-Rak" Stacker Cranes, Monorail Systems, and "Fas-Lok" Storage Racks at 1330 S. Kostner Ave., Chicago, is now a DIVISION OF CONCO ENGINEERING WORKS, INC.

For more facts Circle 500 on Reader Service Card

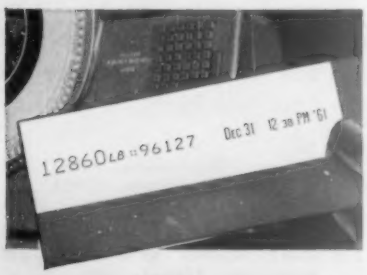
Why you should think of your scales as MONEY WEIGHING MACHINES

Cold, hard cash is the final value yardstick you must apply to every material or product that moves into, through, or out of your plant. How much does it cost? How much does it save? How much profit does it produce? In the last analysis, the answer always comes up in dollars and cents.

With dollars at stake, the *right* Toledo Scale at each weighing point is of the *utmost importance* . . . the backbone of control your needs demand. Your Toledo representative will take a personal interest in helping you get all the benefits provided by advanced Toledo methods and equipment. Write today. Toledo Scale, Division of Toledo Scale Corporation, Toledo 12, Ohio. *(Toledo Scale Company of Canada, Ltd., Windsor, Ontario.)*

TOLEDO PRINTWEIGH® "400"

provides complete printed weight records



Prints where you wish on full 8½" x 11" forms, or on tickets or strips. Prints full figures, even when unit weights are used. Positive weight identification, with selective numbering, weight symbols, or consecutive numbering. Also prints time and date, if required. Weight data may be transmitted electrically to remote adding or other office machines. Ask for Bulletin 2017.

SERVICE Factory-Trained 240 Cities

TOLEDO®

Headquarters for Weighing Systems

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

BUILDING

35—Roofing, siding. Bulletin 6482 (4 pages) tells about corrugated asbestos-cement roofing and siding sheets. Also has data on corrugation pitch, staggered-joint application with square corner sheets, etc. *The Philip Carey Mfg. Co.*

36—Brick floors. Here's a 4-pager (E27b) that describes preparation of corrosion- and wear-resistant joints to reduce costly floor maintenance. Tells other money-saving procedures for installing brick floors. *The Master Builders Co.*

37—Concrete sawing. This 4-page brochure, "Do's and Don'ts of Concrete Sawing," summarizes the fine points learned during the past 10 years about concrete sawing. Covers equipment selection, operation, and maintenance. *Clipper Mfg. Co.*

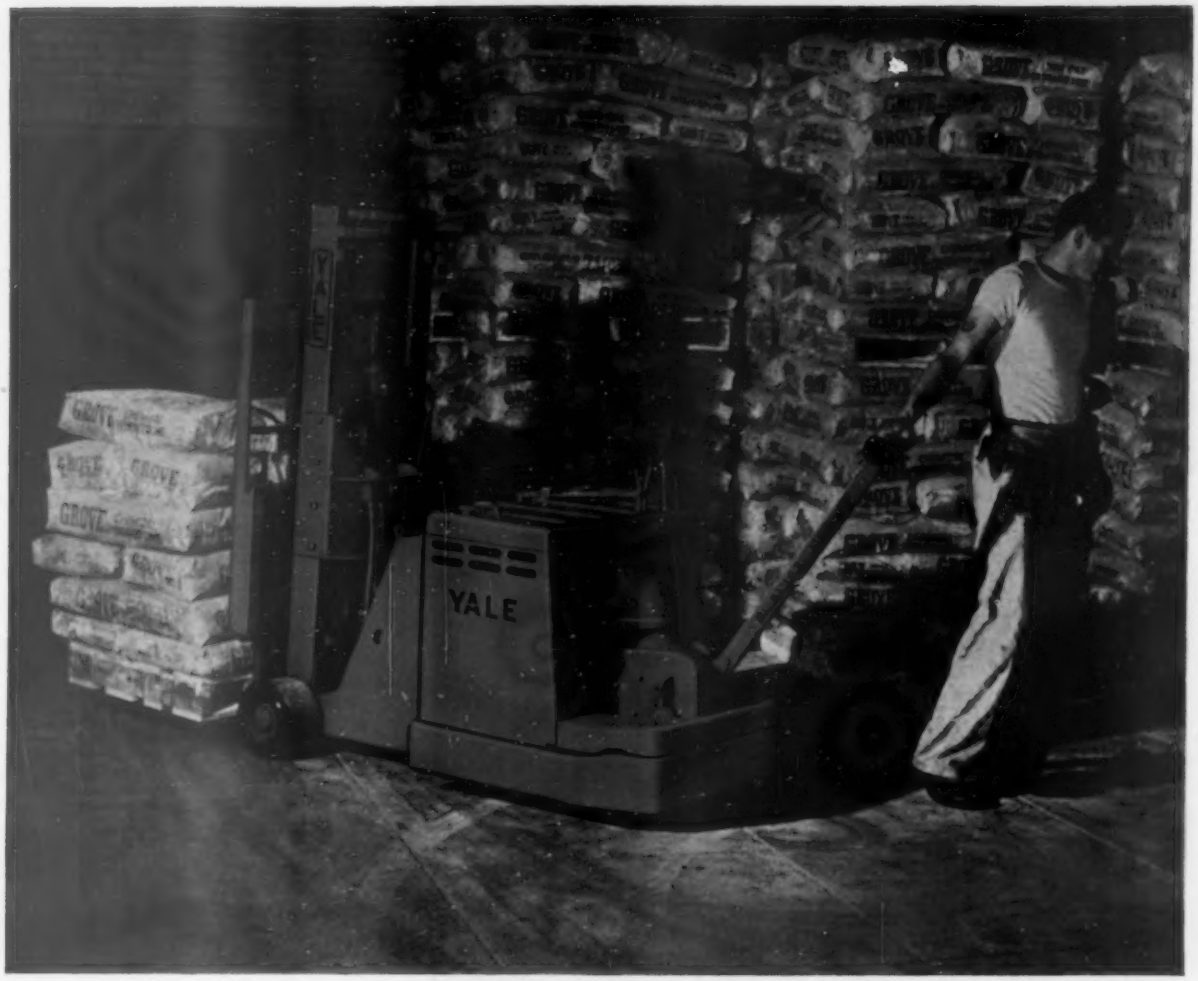
MAINTENANCE

38—Hard-facing electrodes, wires. This 44-pager (1316A) tells how hard-facing alloys protect equipment, reduce maintenance time and costs. Describes electrodes, gives applications. Classifies hard-facing materials. *Air Reduction Sales Co.*

39—Sanitation supplies. Here's a spiral-bound catalog (118 pages) that discusses various phases of building maintenance. Includes wide selection of materials: cleaners, waxes, floor-conditioning machines, and the like. *Lien Chemical Co.*

40—Safety belts. Bulletin 1302-6 (8 pages) presents belts, harnesses, straps, lanyards, and other products designed for worker comfort and protection. Describes types of leather and webbing. *Mine Safety Appliances Co.*

41—Dust separator. Bulletin E221 (12 pages) has performance data, selection and dimension charts, descriptions for HV cyclonic separator



Step up intra-department materials handling...with Yale Worksavers that are exactly right for your requirements. Available in low-lift pallet, stacker, tractor, and high-lift and low-lift platform series. Capacities from 1,000 to 10,000 pounds, plus full selection of cost-cutting attachments.

Yale Worksavers®...Built to do a job on hidden costs

Where rider truck time is being wasted on jobs that don't need a big truck . . .

Where obsolete equipment can't maneuver or keep jobs moving fast enough . . .

Where floors or elevators can't take the weight of bigger trucks . . .

It's time to move on these hidden costs with Yale Worksavers! These compact, efficient load-handlers are designed especially to supplement big rider trucks in hundreds of handling jobs.

Worksavers handle at least 25% of the loads carried by heavier trucks. They maneuver with agility, maneuver into tight places, roll safely where bigger trucks can't fit or are too heavy. *And they are quality-built to give you years of continued rugged service.*

Most important, one of the Yale flexible leasing or finance plans can put a Worksaver on the job for you immediately. See your Yale representative. Or write direct to Yale Materials Handling Division, Philadelphia 15, Pa., Dept. M-102. A Division of The Yale & Towne Manufacturing Company.

YALE®
INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS • HOISTS
YALE & TOWNE

For more facts Circle 502 on Reader Service Card

Boxes or Trays

Switch to Toteline Molded Fiber Glass materials handling boxes and trays to eliminate maintenance expenses. You can forget about re-nailing, re-painting, re-enameling, straightening and other repairs.

Toteline products are practically indestructible. You can't dent or bend them. They won't warp and they're stronger than steel on a strength-weight ratio.

That's not all. You improve your materials handling system. Toteline boxes and trays have smooth surfaces and rounded corners. They don't splinter. Cleaning is no problem . . . just dip in hot water. Toteline products resist acids and solvent chemicals.

As designed for use on conveyor belts, Toteline products have additional reinforcement at the ends. They can be used as a nesting box for parts-in-storage at big savings in space. They can't leak.

Whatever your needs, there's a Toteline product for you. Trained materials handling engineers are available to work with you on special problems. For more information, fill in and return the coupon below.

by TOTELINE

MOLDED FIBER GLASS TRAY CO., LINESVILLE, PA.

One of the Molded Fiber Glass Companies

World's Largest Producer of Reinforced Plastic Trays and Tote Boxes

We are interested in how Toteline Molded Fiber Glass reinforced boxes and trays can eliminate maintenance expense while improving materials handling. Please send further information.

Briefly, here is how we use parts handling boxes or trays_____

Name_____ Title_____

Company_____

Address_____

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

and supports. In 20 standard sizes, can handle volume of air from 150 cfm. up. *The Day Co.*

42—Maintenance materials. Floor and roof repair, machinery anchoring and grouting, electric motor cleaning are subjects covered in 24-page 1961-1962 Catalog. Tells of new formula instant floor patch. *Ranco Industrial Products Corp.*

43—Floodlights. Catalog 2727 (12 pages) describes new sealed-beam lamp floodlight series to provide economical illumination for driveways, parking lots, buildings. Lists accessories, lighting selector data. *Crouse-Hinds Co.*

44—Maintenance repair. This 16-pager (No. 24), "One Way to Make Your Job a Little Easier," tells how to repair machinery fast at low cost, eliminate heat treating, quench cracks. *LaSalle Steel Co.*

45—Dust arresters. Bulletin 164-6 (8 pages) covers automatic bag-type arresters that collect dust without interruption during bag cleaning. Design and assembly information, dimensions, capacities, and photos. *Buell Engineering Co., Inc.*

MECHANICAL

46—Pumps, accessories. Catalog 21 is a comprehensive 76-pager that covers every requirement for a complete hydraulics installation. Describes 96 basic models of miniaturized hydraulic pump; switches, valves, gauges. *Oil-Dyne, Inc.*

47—Ball bearings. This 64-page wire-bound handbook has information on more than 500 types and sizes of miniature and instrument-size bearings, other products. Gives load ratings, testing data. *Miniature Precision Bearings, Inc.*

48—Connecting, sealing. Bulletin WB-1 (8 pages), entitled "How, When and Why to Use a V-Band

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

Coupling," explains how the simplified fastening of the coupling can improve functional design, decrease assembly time, etc. *Aeroquip Corp.*

49—Clutch, brake. Here's a 6-pager (52300) that describes Type MS-Unit for crankshaft mounting. Also used where space is limited or for conversion units where it is desirable to have overhung flywheel drive. *The McKay Machine Co.*

PRODUCTION

50—Rotary feeders. Design and safety features, operation, and other data are provided in 6-page bulletin. The S.T.T. Type is the only rotary feeder with adjustable periphery seals and renewable tips on rotor blades. *Beaumont Birch Co.*

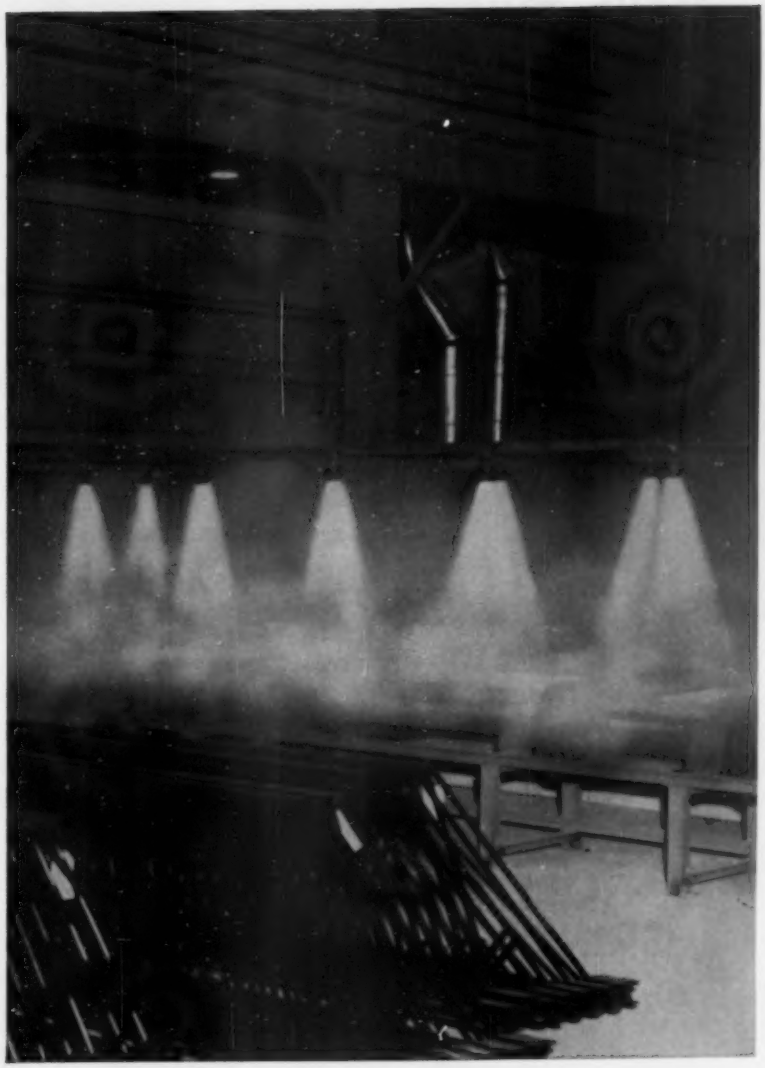
51—Flat finishers. Catalog FF-755 (12 pages) describes finishers for grinding, polishing, deburring flat work. Includes specifications, special features of equipment, applications, accessories. *Hammond Machinery Builders, Inc.*

52—Pressure blasting. Special report (12 pages) tells about the proper selection and use of aluminum oxide and silicon carbide abrasive. Also covers areas of application for pressure blasting. Charts and drawings. *Norton Co.*

53—Assembly tools. This 16-page catalog (No. 75-A) contains useful information on automatic and semi-automatic equipment for staking, swaging, riveting, punching, marking, terminal setting, and so on. Tells how and where to use tools. *Black & Webster, Inc.*

54—Arc Welding. Specifications, operating characteristics, mechanical properties, application data on mild steel and low hydrogen electrodes are given in 20-page welding manual. Includes welding terminology, etc. *The McKay Co.*

Turn the page



What put out the flo-coat and drier fire?

For fires in flo-coaters, driers, quench tanks, dip tanks, storage rooms . . . nothing beats a Kidde fully automatic carbon dioxide fire extinguishing system. U.L. and F.M.-approved Kidde systems go into action at the first sign of a blaze, snuff out fire in seconds, leave no mess to clean up later. Protect yourself by protecting volatile solvents, gases, flammable liquids—*all hazards*—with an automatic Kidde system. Kidde's 40 years' experience can help you guard any fire hazard. Write today and find out how.

Kidde

Industrial and Marine Division
Walter Kidde & Company, Inc.
832 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

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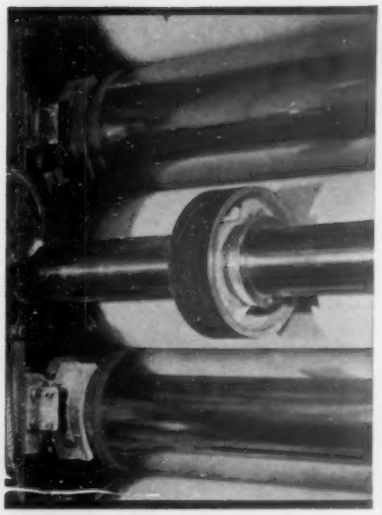
HAVE YOU SEEN THIS ?



NOW...YOU CAN SAVE MONEY– REDRESSING ROLLS IN YOUR PLANT WITH THE ROY PORTABLE ROLL GRINDER

That's right . . . with the **unequalled** Roy Portable Roll Grinder you can redress rolls in place . . . on the calender itself **or**, if you prefer, on special Roy Cradles which can be kept **in your plant.** Think of the savings! You can eliminate excessive downtime, maintain better quality standards **and** reduce "extra-roll" inventories. The "PRG" will redress all filled rolls of wool, cotton, husk, rubber or paper on super calenders and will accommodate steel or cast-iron dryer rolls, in place . . . as well as horizontal mill-type steel rolls. Let's hear about your roll problems, today.

B. S. ROY & SON COMPANY
801 SOUTHBRIDGE ST., WORCESTER, MASS.

Please tell me if you can help us redress our_____ rolls approximately_____ inches in width.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

Begins on page 164

CATALOG NEWS

For more data, circle item numbers you want on Reader Service Card.

55—X-ray films. Here's a 25-page handbook (210.991) that contains comparison tables of maker's five Structurix industrial films, technical details, and Sensitometric curves. Charts give exposure data. *The Gevaert Co. of America, Inc.*

56—Diamond tools. The use of diamonds for wheel dressing and truing tools is discussed in 4-pager. Other uses include turning and facing, reaming, boring, engravers' tools, drills, saws, etc. *Victory Diamond Tool Co., Inc.*

57—Automatic polishing machine. Here's an 8-pager that describes new machine designed to produce precision controlled finishes on sheet-type materials. It uses a wheel drum of abrasive impregnated nylon. *Yates-American Machine Co.*

PLANT SITES

58—Iowa. Two fact-filled reports tell all about Clinton and surrounding area. "Industrial-Economic Survey" has 116 pages of data. "Annual Wage Survey" (42 pages) covers wage rates, practices, policies. *Clinton Development Co.*

59—Nevada. Plant site facilities that make Las Vegas a desirable place are set forth in 40-pager. Describes industrial operations, tax valuations, employment, wages. AND its recreation area. *Las Vegas Chamber of Commerce.*

60—Kentucky. Survey discusses industrial and related features of Bowling Green. Covers employment; gives current wage data, existing industries, and available sites. *Texas Gas Transmission Corp.*

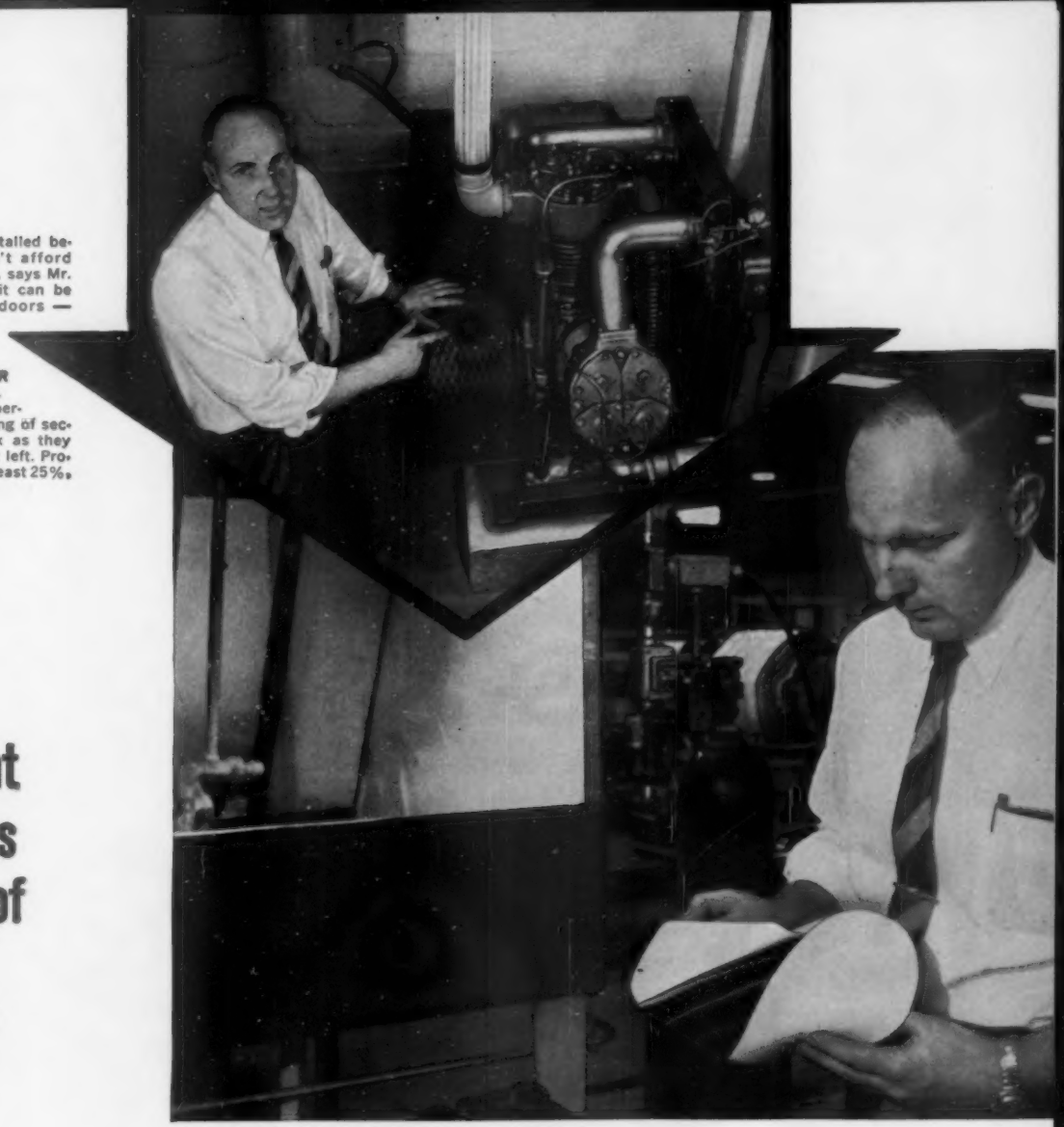
61—Idaho. New 66-page brochure presents site descriptions and maps for northern, southwestern, south central, and southeastern sections of the state. Gives details of markets, labor, taxes. *Dept. of Commerce and Development.*

We like to work with hardboiled plant location people. The harder-boiled the better. That's because we can prove the Toledo-Northwestern Ohio area offers unmatched opportunities for these specific industries:

PAPER AND PLASTICS PRODUCTS
BUILDING AND STONE PRODUCTS
FOOD PROCESSING • CHEMICAL PROCESS
MACHINERY PRODUCTION
PRIMARY METALS • ELECTRONICS

Our proof is contained in a survey of the area by Fantus Research, Inc., one of the nation's foremost industrial location services. For more information, write or call R. E. Johnson, Manager, Industrial Development Department, The Toledo Edison Company, Toledo 1, Ohio.

THE TOLEDO EDISON COMPANY
an investor-owned electric light and power company serving Northwestern Ohio



LE ROI 50S2 was installed because Bowes couldn't afford compressor downtime, says Mr. LaFara. Air-cooled unit can be used indoors or outdoors — needs no plumbing.

FINISHED TIRE REPAIR SECTION is inspected. Compressed air now permits automatic spraying of sections with liquid latex as they pass through booth at left. Production increased at least 25%.

This plant minimizes the risk of "no air - no work" with a

LE ROI 50HP STATIONARY COMPRESSOR

A dependable compressor headed the list of critical needs when Bowes Seal Fast Corp., of Indianapolis, Ind., merged two plants under one roof. A Le Roi 50S2 two-stage compressor provides this vital dependability . . . and all the compressed air needed to produce over 2000 various items for the upkeep of cars, tires, and tubes.

James S. LaFara, Plant Manager, reports that the Le Roi unit delivers 210 cfm at 125 psi . . . operates 75% to 80% of 8- to 16-hour production days, five days a week, and supplies almost 100% of all the compressed air needed. Down-time, he adds, is at a minimum, and maintenance costs are below those of two smaller compressors which the Le Roi replaced, and which now serve only as standby units.

Look what this Le Roi 50S2 does! It provides air to spray tire-repair sections (boots) and tubeless-tire repair plugs with a mixture of liquid soap and water. The unit powers latex spraying machines, and blows scraps from tube-patch cutting machines. Other uses include air for lead moulding equipment, nut-driving units, cleaning vents on chemical filling machines, and for the plant's fire-protection system.

Are you looking for a "dependable" compressor? Check the complete line of Westinghouse unit-type and Le Roi stationary air compressors — from ½ to 100 hp. Contact your Le Roi distributor, or write to Le Roi Division, Westinghouse Air Brake Co., Sidney, Ohio.

SC-08

LE ROI STATIONARY COMPRESSORS

PORTABLE AND TRACTAIR® AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

For more facts Circle 507 on Reader Service Card

HYSTER

COFFEE BREAK

It's an American institution, argued pro and con by businessmen, educators, labor unions and secretarial pools. Few argue with the coffee—it's the length of the break that affects productivity and profits.

For companies using industrial trucks, Hyster has a possible answer: make 'em want to stay on the truck!

Industrial designer Henry Dreyfuss and his staff spent hundreds of hours designing a lift-truck seat, for example, that is just right for the operator. Not too hard, not too soft. Leg-room is another key to comfort. Whether the operator is five-foot-four or six-foot-four, he finds the controls perfectly located for easy, safe operation.

Take a look at pedals, steering wheel, load control levers. These trucks have been built by people who know the problems of the men who use them. We call it "human engineering." You'll call it profits. This is the line that sets the engineering pace for all lift trucks.

INDUSTRIAL TRUCK DIVISION—Lift trucks, mobile cranes, straddle carriers
TRACTOR EQUIPMENT DIVISION—Construction and logging equipment
MARTIN TRAILER DIVISION—Heavy machinery hauling trailers
INTERNATIONAL DIVISION—Overseas manufacturing, sales and service
Manufactured in: Portland, Oregon (Home Office) • Danville, Ill. • Peoria, Ill. • Kewanee, Ill.
Australia • Brazil • England • France • The Netherlands • Scotland • Union of South Africa

NEWEST TRUCKS – NO INVESTMENT
CALL YOUR HYSTER DEALER

HYSTER COMPANY
INDUSTRIAL TRUCK DIVISION
P. O. Box 847 • Danville, Illinois

For more facts Circle 508 on Reader Service Card

Problem: Lack of pep -- and people -- due to bad air

This plant needs make-up air! If production is off because your workers lack pep or become sick from bad air, check your exhaust system! Its fans may be removing air faster than you replace it. This causes a vacuum that can put your plant ventilation dangerously out of balance. Your plant needs make-up air...a supply of new air to replace exhausted air.

Without make-up air, the vacuum can cause down drafts in combustion flues and exhaust hoods, exposing workers to carbon monoxide and other dangerous fumes. Vitality sags. Absenteeism rises. Production drops.

Solution: install a make-up air system -- fans to bring in fresh outside air, and heaters to temper it. You cancel out the vacuum, ease the load on exhaust fans and the regular heating system. No ventilation plan is complete without make-up air.

For technical help on make-up air, see your Consulting Engineer. Or call in Sturtevant application engineers. They're experts in handling air...whether you want to move it, heat, cool or clean it. J-00710

WESTINGHOUSE ELECTRIC CORPORATION
Sturtevant Division, Dept. HO-10
Hyde Park 36, Mass.

Send me your make-up air booklet.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

PHONE_____

You can be sure...if it's **Westinghouse**

For more facts Circle 509 on Reader Service Card

LABOR RELATIONS NEWS

By Paul Ruig, Member, New York Bar

When a worker goes too far in the hole, *you* pay

Employees are not heeding that age-old precept—neither a borrower nor a lender be. How do you clamp down on garnishments without offending the union?

NEWS TIPS

- If paying employees in cash becomes a burden, you should have no trouble with the union when changing to a check system. However, either an armored truck or convenient bank must be available for cashing the checks—at no cost to the employee.

- Foremen, supervisors, and labor relations men can buy a capsule education on the law of labor relations. It's the "Primer of Labor Relations," a 91-page booklet published by the Bureau of National Affairs ($1). For another dollar you can get a 48-pager, "Proving Your Arbitration Case."

- If you have faced a union on the issue of major medical plans, you already know its attitude. It was summed up neatly in a survey reported in the April *Monthly Labor Review:* "They do not assist the worker in budgeting his ordinary health care expenditures." Most doctor bills don't exceed the "deductible," unions say. "What the wage earner wants is comprehensive coverage that starts right at the bottom covering all the small bills and works upward toward the infrequent major expenses."

- A five-day suspension is a reasonable penalty for refusal to work overtime on Saturday, concludes Arbitrator Lloyd H. Bailer. He waved aside the union's contention that the employee was worn out. She should have told this to management at the time.

Says the National Association of Manufacturers: "The prospect of four times as many garnishments in 1961 as there were four years ago is feared by a number of companies."

From the management cost aspect alone, the burden is significant—for every $100 employee indebtedness, management spends $20 to process the collection, according to a recent Long Island Railroad survey. The Crane Company of Chicago figures that each garnishment costs the company $50; each wage assignment, $20.

Whichever statistic appeals to you, it is certain that garnishments are costly and if you check your records, you'll probably find that they have been on the increase in your company. Crane found that 1480 had been filed in a 16-month period.

What can you do? First, clamp down with a reasonable rule—as Crane did. The rule: "Two of these documents served on the company within a 12-month period and the employee can be fired." The Celanese Company set up a rule calling for discharge on the receipt of the third garnishment within a given period. "Recent studies indicate that a majority of companies dismiss the employee who has become a three-time debtor," according to the NAM.

But what about the union? Must you get its blessing? "No," says arbitrators who've heard cases based on these new company rules. First, both rules were reasonable. Second, both companies notified employees about the new rule. (This can be done by a bulletin board notice; a letter in the pay envelope; an article in the plant newspaper. But notice is important.)

In the Celanese case, the arbitrator said the rule was not applicable to an employee who was already heavily garnished when the new rule went into effect. (Here's a thought: Give such an employee a reasonable time in which to clear up his record before the discharge rule will be enforced. Arbitrators might go for that.)

A third phase of "operation garnishment" is to enforce the rule uniformly. Don't relax it in favor of a pet employee. If you do, the union will be in there kicking—successfully, too.

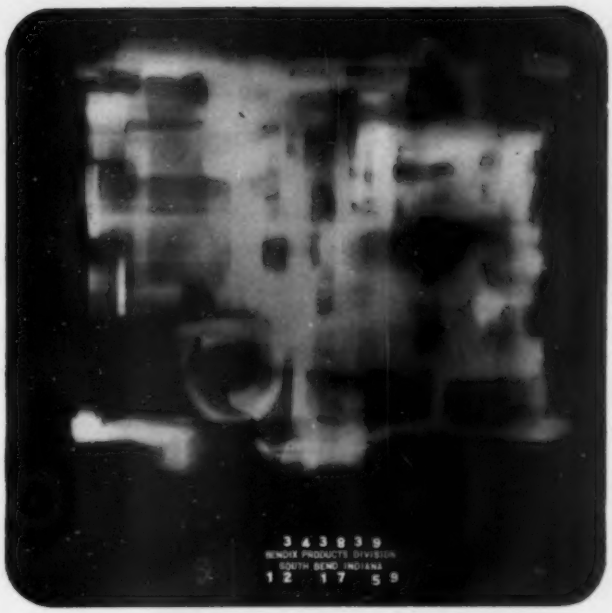
So much for rules. The NAM also suggests a program of education: "The real dilemma of garnishment lies in finding ways to help the employee who is not a 'deadbeat,' but who suffers from low sales resistance and tends to be susceptible to so-called bargains. One preventive measure is to inaugurate an educational program via company publications or plant meetings to create employee awareness of the problem and wariness of shoddy selling practices."

For example, tell them something about the perils of the balloon note, the "add-on contract," the "blank contract," and "deficiency judgments" (see FACTORY, July 1961, page 170). In the course of telling employees these things, make *your* position as a company clear. And take the time to tell them about the pitfalls *before* they get into debt—not after.

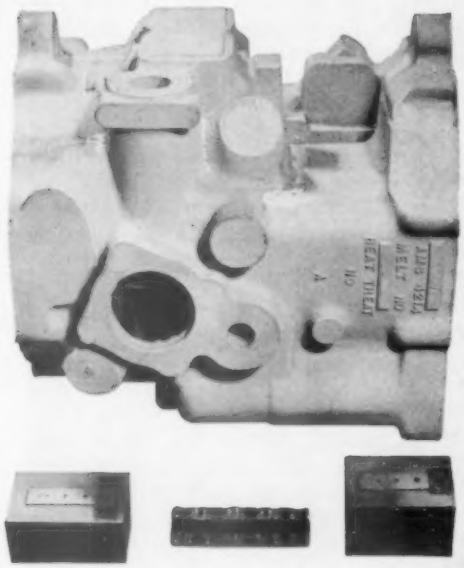
Turn the page

ITS JOB:

Watching the diet of hungry jets



Radiograph of casting showing soundness and condition of internal passages.



Casting for jet engine fuel control valve made by Bendix Products Division, South Bend, Indiana.

A maze of passages and channels, this intricate casting becomes a jet fuel control valve. Bendix checks the soundness of the body and clearness of the passages with Kodak Industrial X-ray Film.

FEEDING 2500 gallons of fuel an hour with precise control is the task for this casting. It will be machined to infinitesimal tolerances and then precision fitted with valves and controls. Is the casting sound? Are wall thicknesses correct? Are internal passages clear? Bendix Products Division, South Bend, Indiana makes sure with radiography.

Radiography is the one means of non-destructive testing that not only inspects internal conditions but provides a record of the findings.

Producers of castings and makers of welded products use radiography to make sure that only quality work is delivered—a means of building a good reputation and increasing business.

Radiography may be important in your work, too. Why not discuss it with an x-ray dealer—or write us for a Kodak Technical Representative to call?

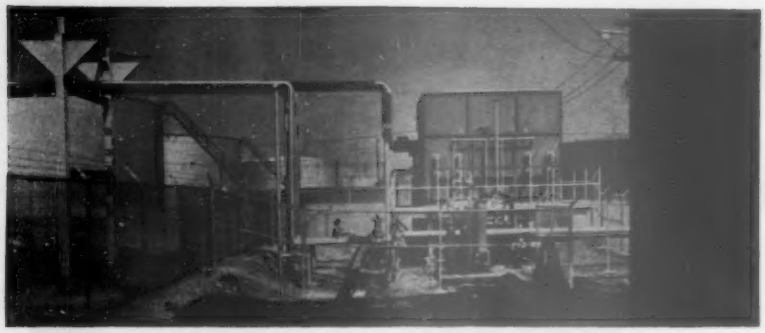
NOW . . . Ready Pack in ROLLS and SHEETS

Kodak Industrial X-ray Film, Types AA and M, in 200-ft. rolls (16mm, 35mm, 70mm) and sheets (8 x 10, 10 x 12, 11 x 14, 14 x 17).

- No darkroom loading—film sealed in a light-tight envelope.
- Just place Ready Pack in position and expose.
- Film protected from dust, dirt, light and moisture.
- In the darkroom—remove film from envelope and process.

EASTMAN KODAK COMPANY
X-ray Sales Division Rochester 4, N.Y.

Kodak
TRADE MARK



SAVE POWER AND WATER WITH THIS AIR COOLED CONDENSER

NIAGARA *AERO* VAPOR CONDENSERS give sustained full capacity in condensing vapors by evaporative cooling with only nominal use of water. You have no problem of water availability, or disposal, or quality, or temperature.

The system is self-contained... no cooling tower or spray pond is required. You save not only the cost of condensing water but also the expenses of piping and pumping, and the cost of water handling equipment.

In the Niagara Vapor Condenser the heat is removed at the rate of input and the cooling effect, directly proportional to the load, is controlled by varying the amount of air passing over the cooling surfaces. Operation is automatic and trustworthy.

Liquids and vapors are always held at constant temperature under close control. You get uniform distillation products the year round. You get better quality and increased production.

Non-condensibles are effectively separated and sub-cooled, giving you better vacuum pump operation. You save power and steam.

Niagara *Aero* Vapor Condensers are manufactured in standard units in a range of capacities up to thirty million BTU's. Write for full information; ask for Bulletin 139-R.

NIAGARA BLOWER COMPANY

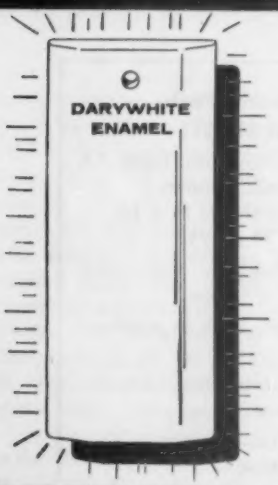
Dept. F-8, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U.S. and Canada

For more facts Circle 511 on Reader Service Card

Want to see the

"WORLD'S WHITEST ENAMEL"



VALDURA DARYWHITE ENAMEL

Darywhite is one of the whitest, toughest, most beautiful enamels in the world — formulated for walls, ceilings and equipment. This non-yellowing enamel is waterproof and can be scrubbed down repeatedly. Extremely flexible, it withstands abrupt and prolonged temperature changes. Want to see sample panel of Darywhite? ... mail coupon today!

Valdura Heavy-Duty Paint Division • American-Marietta Co., Chicago 11, Ill.

VALDURA PAINTS THAT ENDURE

We'd like to see a king-size panel of Darywhite Enamel.

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CITY.....STATE.....

For more facts Circle 512 on Reader Service Card

Begins on page 178

LABOR RELATIONS

Helpful Hannahs

Fired for being a loyal employee! "There ain't no justice," this employee probably said to himself. He also said it to an arbitration board which agreed—and reinstated him.

The company had posted a job on the bulletin board—as required by the bidding provisions of the contract. It then hired a new employee in violation of the contract. Another employee removed the notice "to save the company from embarrassment," he alibied. He knew the company had hired someone for the job. No sense in having employees bid on a filled job, was there?

At the arbitration hearing, the company introduced all kinds of evidence showing that this employee had been inefficient all along—that he was a poor worker.

With a one-track mind, the Board brushed aside all past but unpunished crimes and misdemeanors. These only proved how lax the company had been. For the offense before it, a reprimand would have been enough.

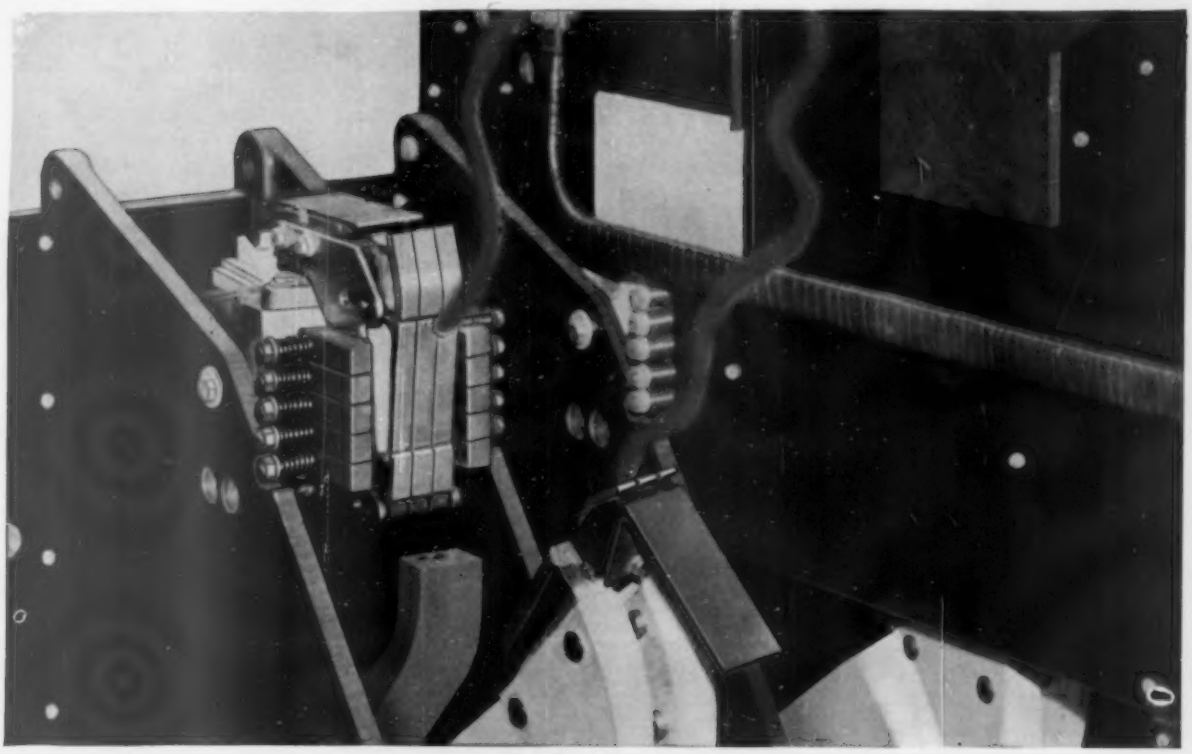
Data for the union

Employers recognize the union's right to certain data during contract negotiations (although some will disagree as to how much they may be entitled to), but many overlook the union's right to data during the contract year—as, for example, when a grievance is filed.

A federal court laid down the law as follows: "The contention that the union's right to data is limited to pending wage negotiations overlooks the fact that collective bargaining is a continuing process which, among other things, involves day-to-day adjustments in the contract and other working rules; resolution of new problems not covered by existing agreements; and the protection of employee rights already secured by contract."

The union, stated the court, is entitled to information to determine whether or not it should file and whether or not its grievance is supported: "Processing the grievance

ALLIS-CHALMERS



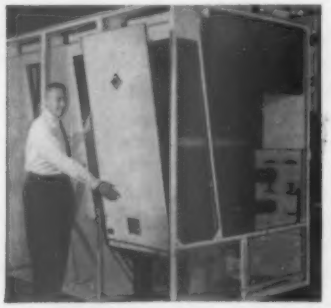
Full protection at 1 million kva

with this 15-kv maximum reliability metal-clad switchgear

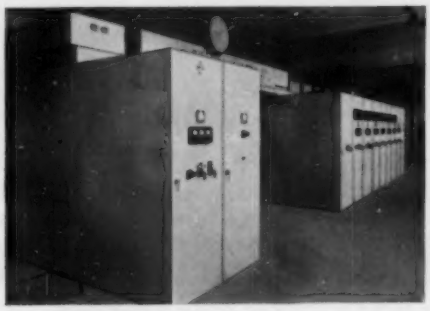
New interrupting capability — 1,000,000 kva and below with *Ruptair* magnetic air circuit breaker in A-C 15-kv switchgear, means complete system and personnel safety.

Here are the *Full Protection* facts:

- Maximum reliability assured . . . insulation designed and tested to give utmost dielectric integrity.
- Breaker tested *in the unit* at *full* three-phase rating and beyond.
- Dead-front construction...the only self-locking front protective barrier.
- 3 hinges and 3 knurled screws strongly secure the front panel.
- *The ONLY switchgear with a front barrier and a front panel.*
- Front accessible current transformers can be inspected, maintained, replaced without exposure to any high voltage compartment.
- Enclosed service aisleway provided in the outdoor *Shelter-Clad* switchgear.
- Entire front panel can be used for meters and relays. Both stored energy and solenoid operators are available in a complete line of 5 and 15-kv switchgear. Simply installed, easily maintained, this new 15-kv switchgear now serves utilities, refineries, steel plants, and institutions. For product details, call, wire or write your nearby A-C office. A-1523



Tilted front steel barrier locks with cubicle to protect operator.



15-kv indoor metal-clad switchgear installed in a western utility.

Ruptair and *Shelter-Clad* are Allis-Chalmers trademarks.

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For those Special Metal Cutting Jobs

MODEL 824D

Cuts 8-inch round and 24-inch flat stock. The 824D will give you extra capacity for special cutting jobs such as kitchen counter tops, steel mats and other projects where a little extra capacity is required. Accurate and dependable.

MODEL 610D

Cuts 6-inch round and 10-inch flat stock. The 610D gives you maximum capacity, accuracy and portability. Excellent as an on-the-job saw for electricians, plumbers and those in light construction and welding. Has all the features of the larger Kalamazoo models.

Ask your Kalamazoo dealer for details and a demonstration of these two units or any of the other fine Metal Cutting Bench Saws in the Kalamazoo line. Remember, Kalamazoo . . . worth more to you.

MACHINE TOOL DIVISION

KALAMAZOO TANK and SILO COMPANY

861 Harrison Street • Kalamazoo, Michigan

Begins on page 178

is not the only obligation of the company." But the Sinclair Refining Company, very much aware of these rulings, still couldn't fathom the logic of furnishing the union with data on matters that the contract said were within "Management's Rights" to handle.

The company had shifted workers from one job assignment to another. This was claimed to be in the interest of good management and justified under the "Management Rights" clause of the contract. The union filed a grievance and asked for:

- Work hours for separate jobs performed the previous year by one of the departments involved.
- Placement and job assignments for the year to date of employees comprising the group to which some had been transferred.
- Work hours and separate job assignments for another department involved in the changes.

"Give it to them" ordered an NLRB trial examiner. In essence, the trial examiner felt that Sinclair had jumped to conclusions when it refused to furnish data relating to matters within management's prerogatives. Whether or not they were in this category had to be determined through the grievance procedure. Sinclair "begs the question by assuming as proven a proposition yet to be established and proven."

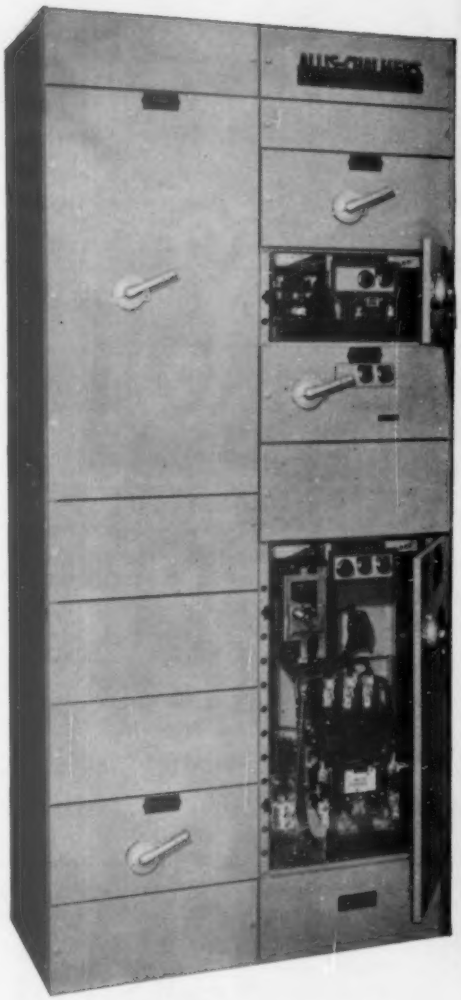
Agency shop

Agency shops have been in the news. What are they—and are they legal?

Under an agency shop, the employee need not join the union—but he must support it financially. In some states, contracts that require employees to join a union are outlawed. But in nine of these states it seemed on the face of it that an "agency shop" would be okay. So unions took up the cudgels. The nine states were Indiana, Arizona, Florida, Kansas, Nebraska, Nevada, North Dakota, South Dakota, and Texas. But after looking closely into it, some of the states decided that even an agency shop is banned.

In Texas and Nevada, the attor-

ALLIS-CHALMERS

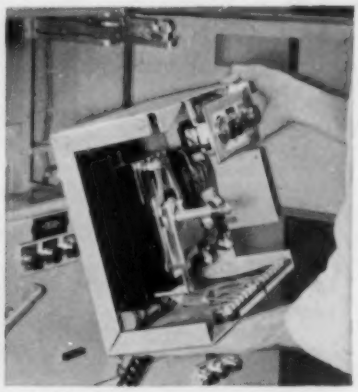


1. Centralized control saves space, cuts installation and engineering costs.

2. Exclusive plug-in terminal blocks permit removal of units without tools. Fully accessible location at front of units simplifies your wiring.

3. Extra heavy plug-in stabs and positive alignment provided by TRACK-GUIDE drawout mechanism assure trouble-free electrical connection.

4. With TRACK-GUIDE mechanism, units can be easily and safely de-energized and locked out, or withdrawn from enclosure for inspection and maintenance.



5. Units can be tilted up for inspection of stabs without removing from TRACK-GUIDE mechanism, or fully removed for bench maintenance or interchange.

...six reasons why Allis-Chalmers new motor control center design is

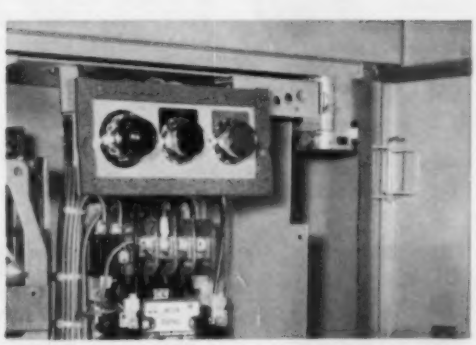
the center of satisfaction

Satisfaction? It comes with every one of the new (yet fully proven) low-voltage control centers from A-C. Their clean lean design saves valuable space. Exclusive plug-in terminal blocks cut installation time . . . speed inspection and removal. *Track-Guide* drawout mechanism lowers maintenance costs. Control units can be drawn out, tilted up, or completely removed without tools.

Safety features of these new control centers provide *sure* protection to personnel. Units can be quickly de-energized for maintenance or inspection work. Units cannot accidentally fall out of *Track-Guide* mechanism during inspection or maintenance.

Reliability . . . versatility . . . economy . . . strength . . . safety. You name the feature — A-C motor control centers have it. *Ask your A-C representative or distributor for all the facts. Or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wis.*

Track-Guide is an Allis-Chalmers trademark. A-1486



6. Mounting of pilot lights and pushbuttons on the removable control units eliminates failures common with hinged wiring.

CM METEOR Electric Wire Rope Hoist

½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous hoist-duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control.

CM HOISTS

FOR { REPETITIVE PRODUCTION APPLICATIONS OR RUGGED MAINTENANCE WORK

HAND or ELECTRIC—CHAIN or WIRE ROPE

CM makes them all! So you can choose a hoist that's perfectly suited to your own needs in a safe, highly efficient CM design. Three of the most popular models are illustrated. Specifications of other types and sizes on request.

CM LODESTAR Electric Chain Hoist

⅛ to 2 ton capacities—First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting mechanical brake and regenerative electrical braking. Overload protection and upper-lower safety switches. CM-Alloy load chain.

CM CYCLONE Hand Chain Hoist

¼ to 10 ton capacities—Easy to carry and lift. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

ALSO CM Pullers, Trolleys and Cranes

REQUEST catalog and name of local stocking distributor. ——→

CM HOISTS

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Begins on page 178

neys-general said they were illegal. The attorneys-general of North Dakota and Nebraska approved the agreements but ruled they were not enforceable. The same office in South Dakota seemed to put that state in the unlawful column. In Arizona and Kansas, the courts concluded that agency shops were illegal. In Florida and Indiana, the courts decided in their favor, but the NLRB ruled against them under the Taft-Hartley Act.

Disciplinary layoffs

If the union contract says nothing about such layoffs or suspensions, can you impose them anyhow?

Discharge is the capital punishment of industry. Suspension is the penalty for lesser offenses. If the union contract spells out discharge as a penalty, but says nothing at all about layoff or suspensions, can the company waive its right to discharge and suspend an employee?

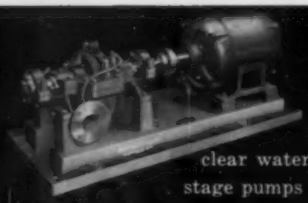
There seems to be little question about it, at least with most arbitrators. But most would also agree that a standard of "just cause" might be imposed, even though such a standard is not prescribed in the contract in so many words. What does this mean? Bluntly, it means that the *arbitrator* can determine if there was good reason for imposing the layoff —and whether or not it was for too long a period.

Veterans' Rights

Layoff is nothing but a polite term meaning that the employee is out of a job, as this lawsuit brought by an ex-soldier makes very clear.

The employee was laid off. He had recall rights, but before he was recalled, he entered the Armed Services. The day he was "recalled" he was pushing snow around for the Army in Alaska. When he was released, he went back to work for the company with seniority dating from his latest employment. He argued for seniority dating from his first employment. Said he: "The Universal Military Training and Service Act requires an employee to be

Clear Water Pumps— Double suction pumps designed for utmost efficiency in clear water service. Ruggedly built for dependability, minimum maintenance and down-time. Send for Bulletin 955.



High Pressure Pumps —Ideal for boiler feed and other severe clear water service. These multi-stage pumps operate against heads to 1500 ft. Capacities to 900 gpm. For complete facts, write for Bulletin 980.

Close-Coupled Pumps— These efficient pumps save space, simplify installation. No need for shaft alignment. Vertical or horizontal models. Adjustable discharge angle. Write for Bulletin 975.

NEW! 'Buffalo' Hermetic Pumps —Quality pumps with special bearings for use where leakage would be dangerous or costly. Available in a broad range of materials of construction. Write for full details.

Non-Clogging Pumps— Move high consistency liquids dependably and efficiently. Minimize wear and wedging. Inspection simplified by diagonally split shell. Rubber-lined models for moving abrasive or corrosive liquids. Send for Bulletin 953.

Chemical Liquid Pumps —Specially designed for moving most corrosive abrasive or high consistency liquids. Your choice of many types in a variety of trim. Will withstand punishing conditions. Write for Bulletin 976.

GPL*

Heat Transfer Pumps— These special 'Buffalo' Pumps are designed to handle high temperature liquids. Job-engineered construction includes required alloys, water-cooled bearings and proper packings. Single suction, solid shell design gives peak efficiency. Write for complete details.

***True long-range pump economy depends on GPL (Gallons Per Lifetime)...pumped day-in-and-day-out with a minimum of down-time and maintenance costs. This is the kind of long-lived reliability built into every 'Buffalo' Pump. It is the most important result of top quality design and construction.**

'Buffalo' offers a complete line of centrifugal pumps featuring parts interchangeability and low maintenance. Whatever your liquid moving needs, chances are there's a 'Buffalo' Pump to fit it perfectly. And your 'Buffalo' resident engineer is the man to recommend it. Contact him, or write us direct.

"Buffalo" PUMPS

BUFFALO PUMPS DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

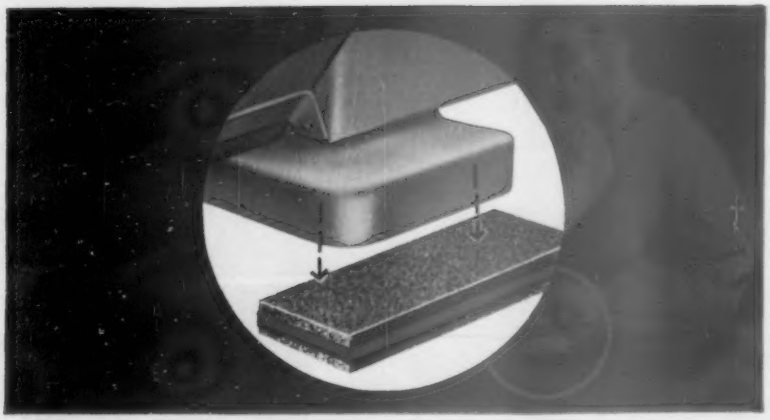
Canada Pumps Ltd., Kitchener, Ontario

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.



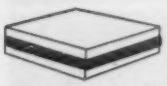
How to Install A Machine For Practically Nothing!

Plant, after plant after plant tell us that Unisorb pads more than pay for themselves by saving time, materials and labor in machine installation.

Now, whether a single unit or a whole plant, installation is a matter of minutes instead of hours. Unisorb pads are cut to size, buttered with Unisorb Cement and machine immediately set in place. No bolts or lag screws, no floor drilling, no tricky spotting. Actual savings go to 80%!

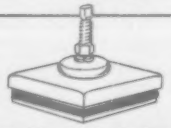
Unisorb is also a lifesaver on plant moves. A Unisorb Mounting Program, prepared in advance, speeds the entire move — production lines can be returned to operation overnight or over a week-end.

Here are the three methods that give you this money-saving machine mounting . . .



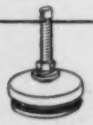
Unisorb Mounting Pads

Specially engineered in a selection of densities and thickness to provide optimum vibration control for all types of machines. Absorbs 85% of transmitted vibration, cuts noise, improves machine performance, reduces maintenance.



Unisorb Level-Rite/ Heavy Duty

The Level-Rite line has been developed for fast, precise leveling and effective vibration control. Machine legs rest on exclusive, free floating screw-post and leveling plate. No bolts, lag screws or cement required, machine is always mobile.



Unisorb Level-Rite "200"

The "Junior" model is a practical, low-cost mount for controlling vibration and maintaining level of small and medium sized machines. Ideal for light machine tools, office, air conditioning and laboratory equipment, layout benches, and shop tools. Loadings up to 200 lbs. per unit.

Remember — to simplify installation, improve performance, and control vibration . . .

UNISORB MOUNTS MAKE THE DIFFERENCE

A complete selection of densities and thicknesses for the smallest laboratory device to giant presses.

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Company.....

Address.....

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FEB-62

Begins on page 178

restored to his seniority if he has left or leaves a position to enter military service."

But said a federal district court: "A worker so laid off is not carried on the payroll, is not subject to supervision by his former employer, is under no obligation to it, is a free agent, and has the right to accept employment elsewhere, without notice to his former employer. In simple parlance, the plaintiff was out of a job at the time he enlisted." He was not in the employ of the company when he went into service.

Paying stewards for "no work"

Several cases have arisen where companies have refused to pay union stewards for the time they spend dealing with employee grievances and meeting with management. Were they justified?

As grounds for their refusals, the companies used the new Section 302 of the Labor Management Relations Act. That section does seem to forbid payments to union representatives when they do not perform work for the company. But the time-honored practice is to pay stewards for time spent on typical grievances.

A case in point recently came before Arbitrator Arthur Stark. The chief steward had been getting regular toolmaker's pay for 40 hours, plus pay equal to the average overtime collected by other toolmakers. He did no production work, was not required to punch in and out, never accounted for his hours in the plant.

Arbitrator Stark conceded that this was the sort of decision that ought to be made by a federal court, and that such a court might not agree with him. Nevertheless, he plunged in with both feet. He ordered the company to continue its payments, for the following reasons:

- The steward's grievance activities were just as much in management's interest as in the union's.
- There's no reason to believe that Congress intended to do away with this established practice.
- The Bureau of Labor-Management Reports has indicated that it

DENNISON DIAL-SET MACHINE with its twist-of-the-wrist copy changing, imprints FANSTEEL'S 5-STUB TAG with information for 12 production operations, product and customer identification, and shipping quantities.

FANSTEEL SAVES $5,500 A YEAR with this Dennison Dial-Set Imprinting System!

Before Dennison Dial-Set, Fansteel Metallurgical Corporation, leading supplier of tantalum capacitors, silicon and selenium rectifiers, refractory metals, electrical contacts and carbide tools, used a liquid duplication method to add variable information to pre-printed system tag forms. Average run was 125 tags.

Fansteel studied comparative costs of liquid duplicating versus other imprinting methods . . . and found that costs of master stencils, tag forms, preparation and processing were excessively high. Dennison Dial-Set was selected to cut the costs. It was a wise choice.

Since Dennison Dial-Set, Fansteel has cut costs three ways. First, savings in tag forms alone total about $1500 a year because liquid duplicating required coated stock. Second, the cost of master stencils, approximating $3000 a year, was eliminated. Finally, Dial-Set's "twist-of-the-wrist" copy changing and 165-impressions-a-minute imprinting speed cut preparation time 75%. No typing stencils for each run and retyping them after 125 impressions. Moreover, the neatness and ease of the Dennison Dial-Set method improved employee morale.

A dollar analysis of your present imprinting method and a cost comparison with Dennison Dial-Set involves no obligation. It may reveal that a Dennison Dial-Set System is the most efficient, most economical method of adding variable information to your pre-printed forms . . . tags, cards or labels. For your free analysis, contact the Dennison office nearest you or write direct to: Dennison Manufacturing Company, Machine Systems Division, Dept. V-104

Dennison

Helping you compete more effectively

FRAMINGHAM, MASSACHUSETTS

BREAK THAT MULTIPLE SHIPPING BOTTLENECK

If you regularly address 5 or more cartons per shipment, you can make important savings and avoid costly errors by addressing your multiple shipments with

STEN • C • LABLS*

As a by-product of office procedure

You can prepare STEN-C-LABLS at the same time as your invoice, order, bill of lading or shipping papers—whatever your procedure or equipment—manual or electric typewriters, electric billing or accounting machines, slave machines or various IDP systems.

Imprinting direct to PANL-LABL on carton

Your shipping department makes unlimited impressions with STEN-C-LABL Applicator direct to PANL-LABL printed on carton eliminating expensive, time-consuming gummed labels. All addressing errors, mis-shipments and repetitive writing are avoided.

DURABLY MARKED AND PLAINLY LEGIBLE at handling distance. A STEN-C-LABL address is sunproof and waterproof—becomes permanent part of carton. Reproduction is sharp and easy to read at handling distance.

You might be shocked . . .

. . . to find how antiquated and outdated your present method of addressing multiple shipments actually is. *Five minutes of your time* in checking your multiple shipping procedures may save you thousands of dollars!

Send for **FREE BROCHURE** *giving full details!*

STEN • C • LABL, INC.

Dept. F-8, 1821 University Ave., St. Paul 4, Minn.

Please send me FREE BROCHURE on saving with STEN-C-LABLS.

Name_____

Company_____

Address_____

City_____ State_____

*Registered U.S. Pat. Off. The term STEN-C-LABL is the trademark and exclusive property of STEN-C-LABL, Inc. All STEN-C-LABLS are manufactured exclusively by STEN-C-LABL, Inc., St. Paul, Minn. under U.S. Pat. No. 2,771,026. Other patents pending. Also available in Canada.

188 **Circle 520 on Reader Service Card**

Begins on page 178

LABOR RELATIONS

has no interest in receiving reports of payments made under legitimate union contract practice.

- No case involving such payment has been prosecuted by the U.S. Attorney General's office.
- There has been no court decision calling these payments illegal.
- The NLRB has never ruled this illegal, either.

Arbitrator Marion Beatty, in another case on the same subject, also made it pretty clear that his award wouldn't stop a court from making a contrary decision. But Beatty went even further than Stark. He okayed payments covering (1) time lost in traveling to and from management meetings, (2) premium pay for holidays lost because of such meetings, and (3) time lost the next day because union representatives had to make up for lost sleep.

To help support his conclusions, Beatty pointed to Section 8 of the Act, which states: "An employer shall not be prohibited from permitting employees to confer with him during working hours without loss of time or pay . . ."

Job bidding

If an employee is competent and has the seniority, he can bid on the job irrespective of his age—even on the job of helper.

Quite apart from any state age anti-discrimination law, it seems that no matter how old a job bidder may be, he can't be eliminated as a candidate if he has the seniority. At least, that's the position one arbitrator took. One bidder was 59 years old, the other 61; and both bid on helper jobs. The company wanted younger men as helpers, felt that this pair was too close to retirement. Arbitrator Carl R. Schedler failed to find age criteria in the union contract. Competence, skill, and ability (that is, if the employee had seniority) were the qualifications, not age, he ruled.

(Items in this section are developed from full citations published by the Bureau of National Affairs, Inc., Washington, D.C., and from other sources.)

Why Did These Firms SELECT

HOLLYWOOD • FLORIDA?

By-the-Sea

Merit Coil & Transformer Co.
Sherman Classics, Inc.
Hollywood Brassiere Co.
Enterprise Manufacturing Corp.
J. W. Bayly & Son, Inc.
Plant City Steel
Dixie-Belle of Hollywood, Florida

Here's Why . . .

- ★ Ideal living and working conditions
- ★ Abundant, contented, skilled and unskilled labor
- ★ Excellent industrial sites and modern industrial buildings
- ★ Rail, truck, air and water transportation
- ★ Home of deep-water Port Everglades
- ★ Hub of Florida's lower East Coast

Your inquiries held in strict confidence and answered in full detail

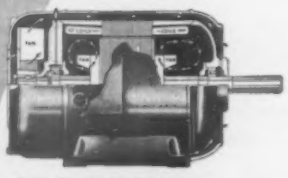
INDUSTRIAL DIVISION DEPT. F-5

CHAMBER OF COMMERCE HOLLYWOOD, FLORIDA

Circle 521 on Reader Service Card

FOR PROVEN ECONOMICAL POWER

AIR COOLED **Custom Built . . . NOT Custom Priced**



VALLEY

BALL BEARING MOTOR

Here's real power, custom built to fit your every requirement. Totally enclosed — fan cooled — polyphase 50 or 60 cycles — constant speed — squirrel cage induction — high torque — low starting current — enclosed ball bearing.

Send for complete details Today.

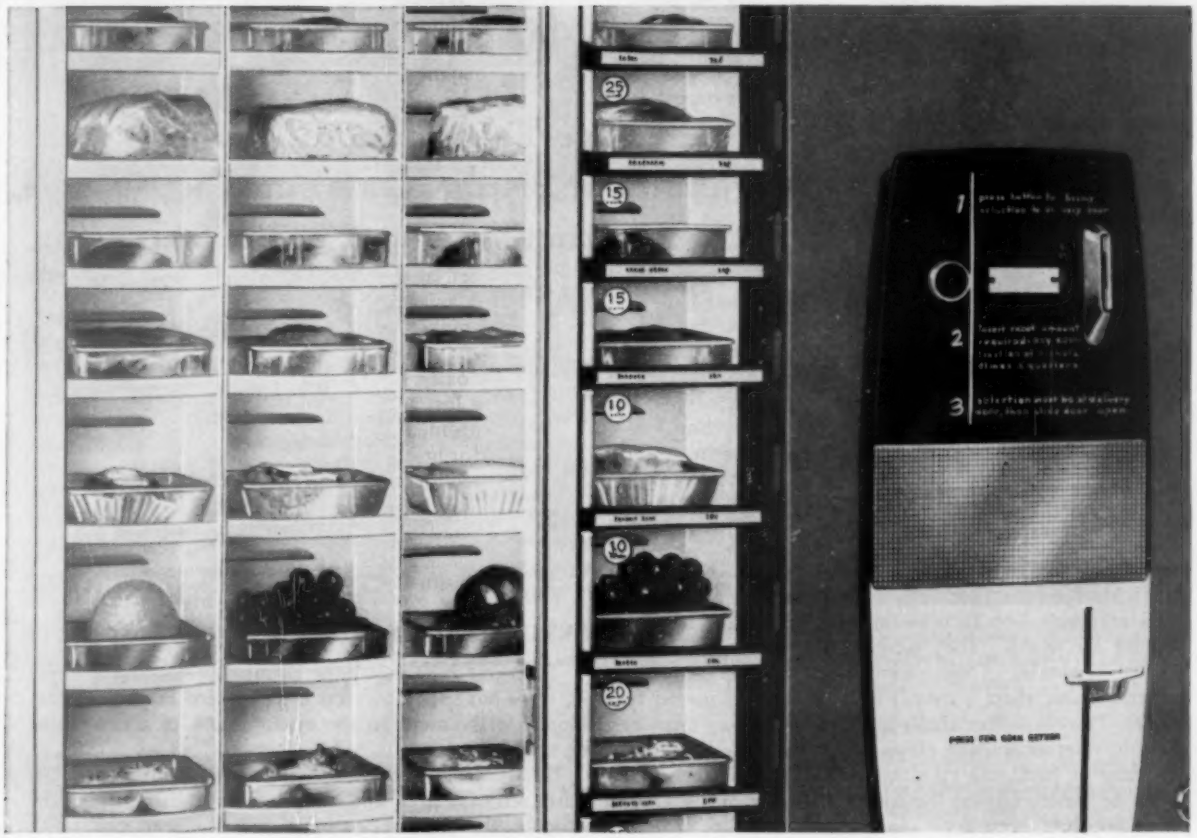
VALLEY ELECTRIC CORPORATION

4221 FOREST PARK BLVD. • ST. LOUIS 8, MO.

Circle 522 on Reader Service Card

FOOD FOR THOUGHT

DELICIOUS FOOD—APPETIZINGLY DISPLAYED . . . QUICKLY SERVED *All 130 items, from sandwiches to entrees, salads and desserts, are seen and served through the showcase windows of this Canteen All-Purpose Merchandiser. All are available any hour of the day or night at the drop of a coin.*



The modern way to serve appetizing meals, delicious snacks

Canteen automatic food service

requires little space, less equipment, no investment

Canteen® automatic food service fits new ways of living and working—the staggered lunch hours, the trend to shorter mealtimes, the preference for snacks at off-hours. There's no waiting in line, no crowding. And, best of all, service is immediate.

The food is superb. Uniformly fresh, wholesome and tasty — planned by dietitians for nutrition and appetite appeal—prepared under exacting standards in spotless commissaries.

Canteen serves good foods conveniently, economically, at realistic prices. You save on space, supervisory time and equipment.

Why can Canteen serve you better? Because Canteen brings experience gained in offering complete food and vending service throughout the country. Because that service is locally operated and managed. Because it is tailored to your needs. Rigid control of quality and varied menus assure complete satisfaction.

For all the facts, call your local Canteen representative. You'll find his name listed in the Yellow Pages of your telephone directory. Or just use this convenient coupon.

AUTOMATIC CANTEEN

AUTOMATIC CANTEEN COMPANY OF AMERICA

Food Service Division, AUTOMATIC CANTEEN COMPANY OF AMERICA
Merchandise Mart Plaza, Chicago 54, Illinois

Gentlemen: I'm interested in knowing what Canteen automated food service can do for us. Please send complete information.

Name_____

Address_____

City_____ Zone____ State_____

For more facts Circle 523 on Reader Service Card

No end to lift truck's use

An expensive overhead monorail seemed to be called for. But the ingenuity of Brunswick's engineers made lift trucks the best possible answer.

Try and move a 13,000-lb. pendulum the length of your factory through narrow aisles and you have a problem in material handling. Give this pendulum a shell you can't afford to break and the problem becomes more complicated. Now, add the need of positioning it exactly when you set it down and the handling problem really gets tough.

The manufacture of glass-fiber nose cones and radomes for missiles and aircraft at Brunswick Corporation, Marion, Va., presents a problem similar to this. The mandrels—or forms—on which the radomes are wound are heavy. They weigh anywhere from 300 to 13,000 pounds. They swing like pendulums while moving—and there's over 1500 feet of moving to be done. The glass-fiber shells are delicate. They must be held to microscopically close tolerances and the slightest dent or bend can ruin them. Finally, the mandrels must be positioned on the rotary tables of the grinders with absolute accuracy.

Brunswick found an ingenious solution for this problem. Normally, an overhead monorail crane would be called for. But such a system lacks the flexibility Brunswick engineers felt was necessary and installation costs would have been too high.

Looking for an alternative that would provide flexibility—with economy—Brunswick engineers came up with an idea for using an old standby in a new way. The old standby? Electric lift trucks.

SIAMESE TWIN TRUCKS

Engineers equipped two Baker electric lift trucks with remote controls. The remote controls allow one man to position mandrels on the grinders with the required accuracy. Conventional controls aren't good enough since there is the possibility of confusion between direction and response. Such confusion can result in ruinous damage to radome, mandrel, grinder, or any combination of the three. Then, too, there is the cost of the extra man. Using remote controls, a single operator can control all movements of the part within thousandths of an inch by a fingertip touch on a control button.

To move the larger mandrels weighing up to 13,000 pounds, Brunswick engineers came up with another ingenious idea. They yoked two electric lift trucks together. The teamed trucks work in perfect unison due to a coupling device which includes a geometric bar (see photo, lower left). When linked in this way, the trucks are maneuvered by two highly skilled drivers. An underload speed of 10 feet per minute allows time for careful maneuvering.

"Our initial cost savings are estimated at 50% of what would have been spent for an overhead monorail system," says Horace Huff, project engineer in charge of radome and nose cone development.

SEVERAL STOPS FOR MANDRELS

To prove how ingenious Brunswick's solution really is, we'll have to show you the problem in more detail. Here are the steps in the manufacture of a nose cone or radome:

First, a truck picks up a bare iron mandrel from the parts removal area and carries it to a grinder. At the grinder, the mandrel is measured or "read out" with micrometric indicator gauges. This establishes a basis for later determining when the part has reached the required thickness.

The winding machine is the next stop. Here, the first layer of filament-wound glass fiber is applied. Positioning of the mandrel on the machine is critical.

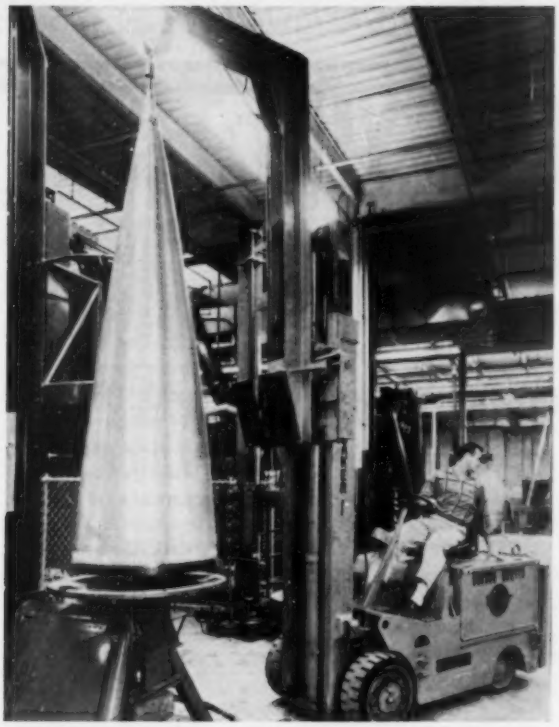
The radome-mandrel now goes to an oven for curing at high temperatures. When it's hardened, a truck takes it back to a grinder for smoothing.

After smoothing, the radome-mandrel goes through the whole process again. This time it's finish-ground to specified thickness. Finally, the radome is jacked off its mandrel at a hydraulic separating stand and sent on for exterior covering and testing.

All in all, the radome-mandrel must be carried over 1500 feet through narrow aisles. And since a mandrel tends to swing like a pendulum, the slightest contact with machinery or equipment can cause a serious dent or bend in its glass-fiber shell.

But the trucks give the control needed. They move slowly enough to prevent excessive swinging and they can move around temporary obstructions without an elaborate switching system. The trucks are flexible too. They can be used as standard fork-lift trucks whenever necessary. Says Project Engineer Huff, "They provide a degree of flexibility that cannot even be approached by a fixed overhead system that would cost twice as much."

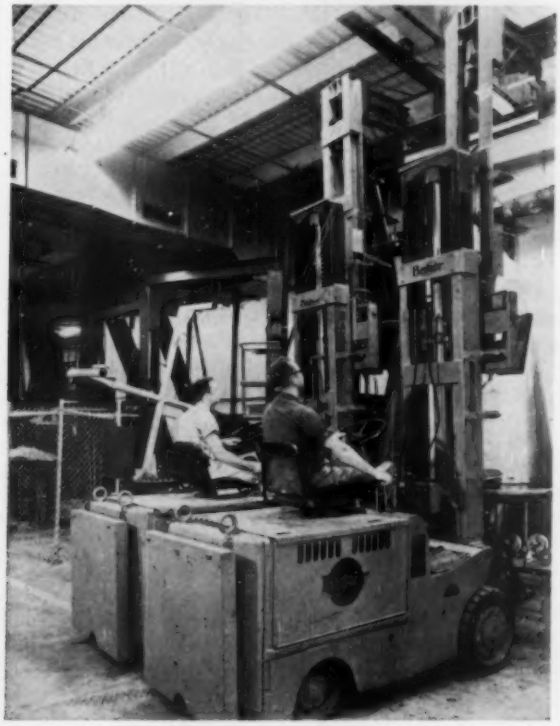
REMOTE CONTROLS allow one man to position heavy radome-mandrel on grinder. Exact placement is essential. This rules out the use of standard controls.



SINGLE TRUCK carries radome-mandrel combination away from grinder. Driver avoids excessive swinging motion by moving slowly and keeping mandrel close to floor.

COUPLING DEVICE yokes two lift trucks for handling heaviest radome-mandrel assemblies. Trucks are driven by two skilled operators, work in perfect unison.

TEAMED TRUCKS lift heavy radome assembly from winding machine. Operators must be careful to keep mandrel and its delicate shell from swinging into any obstruction.



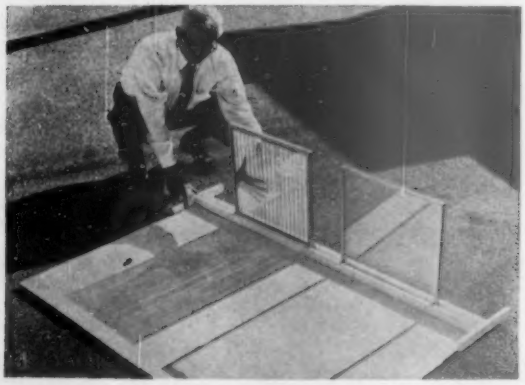
MATERIALS NEWS

For more data, circle item numbers on keader Service Card next to back cover.

A finger-tight fit with a sensitive touch

The touch of this disposable industrial glove is so sensitive the wearer can feel every tiny dot in a book of Braille. Or flip a coin, and with eyes shut you can tell whether it's heads or tails. Ideal for inspection work, small parts handling and any touch-sensitive operation where product or hand must be protected. Appropriately named "Tru-Touch," the glove is made of polyvinyl chloride, only six-thousandths of an inch thick. It's exceptionally tough, with a tensile strength of 1000 to 1200 psi. Pliability is excellent, without "snap" or constriction of other materials. Fit is close, finger-tight, without numbing the touch. Comes in small, medium, and large sizes. *Wilson Rubber Co.* (Circle 195)

Built-in sunshade cuts heat, glare, and maintenance costs



You get all three advantages in "Solarshade" (left panel in photo). It's an answer to the problem of "picture-window" exposure to the sloping or direct rays of the bright sun. Visitors in your office or employees in your cafeteria will appreciate the relief from eyestrain when facing a scenic but eye-searing outside view. Gone, too, is the brow-crinkling sky glare.

"Solarshade" is a sandwich. It's made by the insertion of a pre-framed louvered shade screen between two panes of glass that are hermetically sealed. Screen is permanently located in the dehydrated air space, sealed at atmospheric pressure. Thus, it never gets dirty or weathered, eliminates awnings or overhang. Unit has good thermal insulating value, needs only normal maintenance given to glass windows. *Armour Glass Co.* (Circle 196)

197—Aluminum roof coating serves as both a waterproofer and solar heat reflector on all roofs except wood shingle. Silicone and glass-fiber ingredients promise long life. Brush or spray application, coverage up to 100 sq. ft. per gal. *Pace Products, Inc.*

198—Galva etch cleans and etches galvanized, galvanealed, zinc-treated, and cadmium-plated surfaces preparatory to painting. Provides good paint anchor. Wipe or brush it on, allow to work for a few minutes, rinse and wipe dry. *Martin-Senour Co.*

199—Concrete floor hardener cures, chemically hardens, seals, and dust-proofs floor slabs, walls, and columns in one operation. "Cure-Hard" is easily applied with spray or hair broom. Application cost about ¼¢ per sq. ft. *W. R. Meadows, Inc.*

200—Panel wall system of aluminum grids and translucent glass-fiber panels is capable of long spans without added support of intermediate structural mullions. Requires only perimeter sealing and fastening. Special clamping feature plus easy-to-apply elastic sealing tape give lasting, weather-tight seal. *Kalwall Corp.*

Turn the page

BEST BUY FOR AIR SUPPLY

UP TO 5hp... NEW WORTHINGTON MONOBLOC X-COMPRESSOR

Based on purchase price, on extremely long compressor life . . . and on safety, too . . . your best buy for a 1½- to 5-h.p. air supply is the new Worthington MONOBLOC X-Compressor.

First, the MONOBLOC saves you $30 or more for parts and labor because it comes completely wired. There's no starting switch to buy and install and wire in.

It's more economical, too, because all your money goes to buying a quality motor, compressor, controls and tank. You don't waste it on unnecessary belts, belt-guard, sheaves, long base and on the labor required for assembling them.

Is floor space important to you? The MONOBLOC vertical tanks save over 60% of space required by old-style horizontal units. A 10" radius circle for the 60-gal. tank; a 12" radius circle for the 80-gal. tank.

The MONOBLOC costs less to run. All power goes to the compressor—no power loss in belt friction. (No belt guards or belt replacements.)

Of course, you want long compressor life. The MONOBLOC is built with the new Worthington X-Compressor design that virtually eliminates harmful vibration. The wide-stance X-shape design reduces vibration to the point where a coin can be balanced on the unit during starting, running and stopping.

A silicon-treated filter element removes over 99% of the dirt from incoming air—the most dangerous source of compressor wear. Tapered roller bearings cut friction. The large lubricating oil sump permits better cooling, less danger from low oil supply. These and other design features assure extremely long compressor life.

We and our distributors are ready and happy to show you why there's no better way of buying cheap air today. Call the Worthington Distributor listed in your Yellow Pages. Worthington Corporation, Section 34-8, Holyoke, Massachusetts.

WORTHINGTON

PRODUCTS THAT WORK FOR YOUR PROFIT

For more facts Circle 524 on Reader Service Card

- *Latest mechanical features*
- *Newest techniques in manufacture*
- *Most advanced high strength materials*

PRIME-MOVER PALLET TRUCK

Prime-Mover Pallet Trucks represent the latest engineering design—most efficient production techniques— strongest modern materials. Fewer and stronger parts mean longer, trouble-free, dependable service and performance.

The sealed hydraulic system is precision machined with ground finishes to maintain positive, leak-proof operations. All wear points are cast and machined rather than formed or stamped. Up-dated and made to traditional PRIME-MOVER high standards.

MODEL P-25
$359

MADE IN TWO SIZES:
2500 lb. capacity, Model P-25
4500 lb. capacity, Model P-45

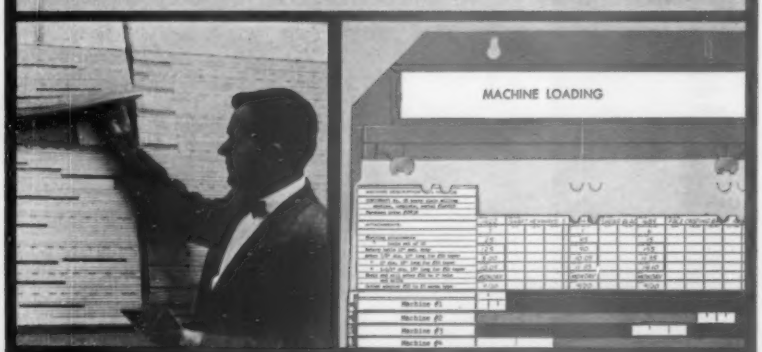
Available in 20½ and 27 inch widths; in 36, 42, 48 inch fork lifts. Model P-25 costs only $359; Model P-45 costs only $395.

Manufactured in Muscatine, Iowa by the PRIME-MOVER CO. and sold by leading material handling equipment dealers throughout the country.

PRIME-MOVER

For more facts Circle 525 on Reader Service Card

NEW LOW-COST WAY TO RAISE OUTPUT



Acme Visible Planning Panels make it easy to stay on top of your shop

Timing is the essence of high production at low cost. And Acme Visible Panels make it easy for you graphically to plan, schedule and follow through every job. Machine loading. Personnel assignment. Shipping. Data cards in pockets keep essential facts at your fingertips. Visible margins portray your scheduling and work progress at a glance. Send for full facts.

ACME VISIBLE

Acme Visible Records, Inc.,
3108 West Allview Drive, Crozet, Va.

Please give me booklet on production planning and control panels.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

For more facts Circle 526 on Reader Service Card

Begins on page 192

MATERIALS NEWS

For more data, circle item numbers you want on Reader Service Card.

201—Heat reflective tape, No. Y-9050, shields heat-sensitive parts up to 600 F. continuously, and withstands 3000 F. radiant heat for short periods. Made of aluminum foil laminated to glass cloth. Widths to 36 in., in 36-yd. roll lengths. *Minnesota Mining & Mfg. Co.*

202—Roof walkway protects built-up roofs from foot traffic. It's made from an asbestos-cement Promenade Tile laid on a trowelled-on cold asphalt cement base. Can be hacksawed or scored for breaking. Comes in flat tiles, eaves, and coving pieces. *Keasbey & Mattison Co.*

203—Floor primer improves appearance, reduces maintenance, forms permanent base for all floor dressings. "First Coat" provides a hard, colorless seal against dirt and spillage. Withstands usual resin or wax-removal methods, will not discolor with age. *Masury-Young Co.*

204—Quik Rok is a fine-textured powder that mixes with water to set rock hard within 20 minutes. It expands to give vise-like grip. Good for caulking around fixtures or pipes, and setting boxes in masonry walls. *Preco Chemical Corp.*

205—Insoluble anode, for electroplating and electrochemical processing, offers the efficiency and quality performance of solid platinum at one-fifth the cost. Made from titanium mesh coated with pure platinum. Mesh design affords large anode area. *Sel-Rex Corp.*

Turn the page

IF YOU BUY THESE

TO IDENTIFY

YOUR PRODUCT

New folder illustrates examples from every industry of profitable, effective product and package identification by Markem machines. Write for your free copy.

. . . MAKING YOUR OWN LABELS
or DIRECT PRODUCTION MARKING
may save you
thousands of dollars
and delays every year

Using labels, decals, transfers, tickets, tags, nameplates or handstamps to identify or decorate your products and packages may mean spending far more money and time than you need — and getting less than perfect product and package identification. In contrast, consider these natural advantages of *making your own labels* or *direct marking* as needed with a flexible, efficient production machine in your *own* plant:

. . . you automatically identify or decorate *as production requires*, with *complete* information in a *single* low cost label or direct print

. . . you cut your *investment* in label inventory . . . and eliminate waste from obsolescence

. . . you achieve *attractive and completely informative* product and package identification . . . that helps the buyer, the user, and the person who reorders

. . . you're *independent of outside sources* and you avoid inconvenience when new identification is needed . . . you can change part or all of the imprint in seconds

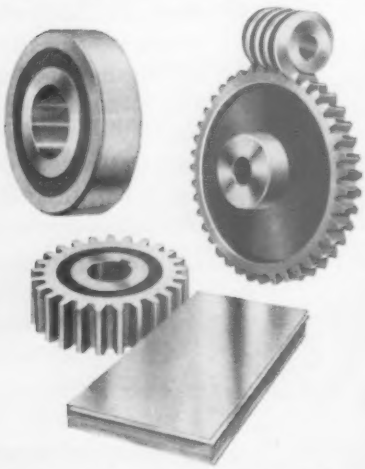
To get specific cost-saving recommendations and figures, call the Markem Technical Representative near you or write the main office. We will describe the particular combination of Markem machine, type, specialty ink and operating method to give you highest quality product and package identification — at the *lowest possible cost.*
Markem Machine Co., Keene 18, N. H.

MARKEM

HELPS YOUR PRODUCT SPEAK FOR ITSELF

VALVOLINE
Tectyl

KEEPS METAL SURFACES FREE FROM RUST



There's a job for Valvoline Tectyl in your industry, protecting metal surfaces against rust and corrosion during shipping and storage.

Low-cost Tectyl rust preventives are widely used by the military services and by industry.

Tectyl's easy-to-apply, easy-to-remove film provides complete protection from the effects of snow, rain, perspiration, humidity, salt air, and corrosive fumes.

There is a Tectyl product for every need, with more than 40 variations of three principal types: oil-type, solvent cut-back and hot dip. Brush on, spray on or immerse. *We suggest you write today for your copies of two helpful, detailed Tectyl charts which give industrial and government specifications and applications.*

VALVOLINE
Tectyl RUST PREVENTIVES

VALVOLINE OIL COMPANY
Division of Ashland Oil & Refining Company
Refinery — Freedom, Pennsylvania • Home Office — Ashland, Kentucky

Begins on page 192

MATERIALS NEWS

For more data, circle item numbers you want on Reader Service Card.

206—Piston rods, made of AISI 1060 steel, are encased in bronze coating for long wear and little downtime. High-temperature spraying fuses "Bronze Case" onto steel rod, creates porous coating that retains lubricant. Rustproof, nick-proof. *Thomson Industries, Inc.*

207—Window coatings tame solar heat, reflect up to 80%. One coating (Heat-Bar LP10) is translucent. Another (LP20), for picture windows, has transparent green tint. Both are washable, good for years. Brush, roll, or spray on. *Professional Products Research Co.*

208—Duct insulation of spun mineral fiber has good rigidity and strength, is less apt to break in handling. Resin-bonded E-Z Ply comes in 2x4-ft. panels up to 2-in. thick. Easily shaped with knife. Has "K" factor of 0.24 at 75 F. *Baldwin-Ehret-Hill, Inc.*

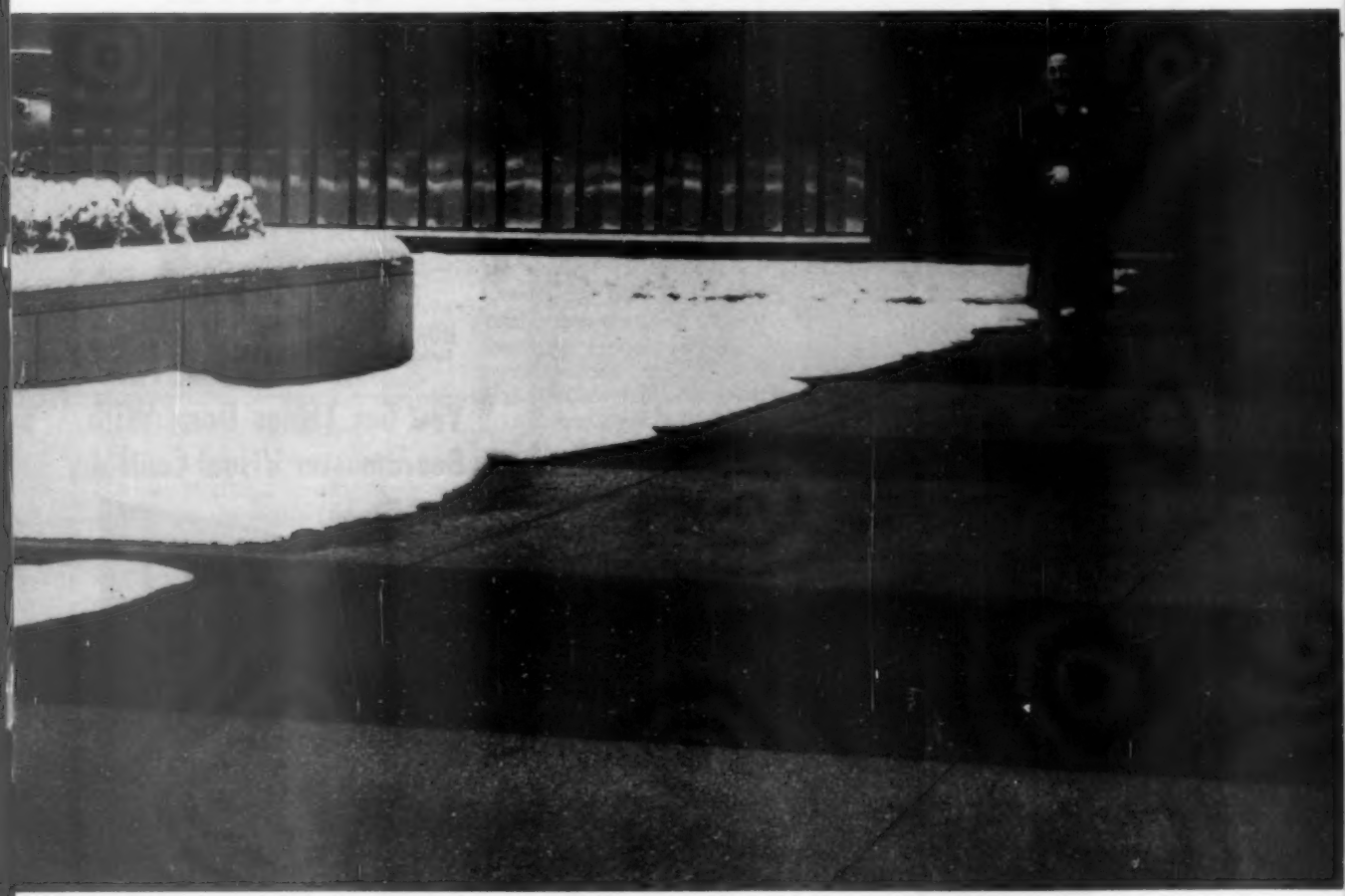
209—Liquid roof treatment provides a tough, elastic roof surfacer out of a single container. Liqui-Mat contains a high-solids-content asphalt emulsion, glass fibers, and bristles that form a seamless blanket. *The Tremco Mfg. Co.*

210—Anti-skid floor coating provides non-sparking surface for fire-hazard areas. Applied ready-mixed on wood, concrete, and metal, painted or bare, indoors and outdoors. Dries overnight. Gray, red, green. *Wilbur & Williams Co., Inc.*

Turn the page

END THIS... Removing snow by shoveling, or with salt, chemicals or cinders costs you money. It ties up manpower which could be used more productively. And you run the risk of over-exertion or injury.

Chemicals and salt erode paving. Cinders require a clean-up job at the first thaw. None of these methods will really do an efficient job; there's still the danger of someone slipping on an icy patch. What's more, your business can be delayed due to snow-covered drives and loading-dock areas.



WITH THIS... There *is* a better way — with a SPANGRID Steel Pipe snow melting system.

Here's a walk with a built-in snow melting system of pipe grids under the paving. It's hooked into the building's steam heating system. At the first sign of snow, the system goes to work and *automatically* melts the snow as it falls.

A SPANGRID Steel Pipe snow melting system costs less than you would think. In the long run it will pay for itself in materials, maintenance and manpower that's saved.

With SPANGRID, you get a dependable, top-quality steel pipe especially constructed for snow melting installations. Consult your piping contractor for complete details. Be sure he specifies SPANGRID Steel Pipe.

SPANGRID Steel Pipe is one of the many fine products produced by *National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pa.*

Steel's Symbol of strength, long life, and economy

ARMCO National Supply Division

For more facts Circle 529 on Reader Service Card

PROTECTIVE—DECORATIVE
...NOT A PAINT OR PLASTER

Give dull, damp or damaged walls a long lease on an attractive life with Adfinish. Swift's new concept in masonry wall finishes works on interior or exterior . . . new or old . . . dry, damp or painted surfaces. Use it to:

Finish or refinish concrete
Finish damp masonry
Spark-up brick, block, stucco
Impart moisture resistance

Not a paint or plaster, Adfinish is a new finishing concept. It's easy-to-use, fire retardant, chemical, moisture and vermin resistant. Comes in three attractive colors.

Return the coupon for details on Adfinish.

Swift
ADHESIVES
106TH YEAR

JUST CLIP TO LETTERHEAD AND MAIL

AD-11
Swift & Company
Adhesive Products Department
115 W. Jackson Blvd.
Chicago 4, Ill.

☐ Send bulletins on ADFINISH
☐ Send information on trial order

Name_____

Begins on page 192

MATERIALS NEWS

For more data, circle item numbers you want on Reader Service Card.

MATERIALS LITERATURE

211—Teflon materials in stock shapes, sizes, and tolerances are illustrated in 8-pager. Includes sheets, rods, tubing, tapes, large-diameter molded bars and cylinders. *Cadillac Plastic & Chemical Co.*

212—Noise reduction is the subject of a 43-page study, "Noise Control, Privacy, and Signature Movable Partition." Discusses basic principles for control of office noise; explains leak-proof partition design. *The E. F. Hauserman Co.*

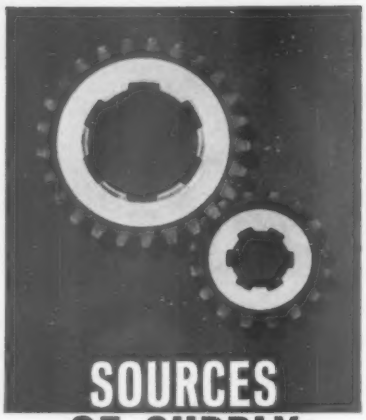
213—New Steels are calling for "New Concepts in Steel Design and Engineering" of structures and equipment. This 59-page brochure shows how modern steels achieve higher strength, lighter weights, and lower costs. *U. S. Steel Corp.*

214—Nylon brushes of all kinds, 128 different types of them, are listed by manufacturer in comprehensive directory. Gives selection hints for various industrial problems. *E. I. duPont de Nemours & Co.*

215—Handbook, (MRG 628, 98 pages), describes tools and procedures for fabrication of rubber-faced steel plate into industrial equipment. Shows how to cut, drill, bend, fasten, and perform more complex operations. *The Gates Rubber Co.*

216—Salt Baths and chemicals are covered in 21-pager (No. 200) for the heat-treat engineer. Data are aimed at solving heat-treating problems. Lists application functions of neutral, nitrate, and cyanide-bearing salts. *A. F. Holden Co.*

217—Anti-corrosive paints containing lead suboxide pigment are described in catalogs 61 A, B, C. They explain rust-inhibiting action, display color cards for primers, finishes, and special tones for color styling equipment. *Subox, Inc.*



SOURCES OF SUPPLY

Suppliers and sub-contractors in the Northern Plains can be pinpointed quickly by the Facilities Register, a unique electronic index of production facilities. Whether yours is a problem of finding new suppliers, contracting for idle machine time, shortening lines of supply, or obtaining better quality and service:

NORTHERN NATURAL GAS COMPANY
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Model 12 straps 240 of these 2′x4′ packages in an hour!

At Celotex, the automatic Model 12 wraps each 6-unit fiberboard bundle twice with strong 18-gauge USS Round Steel Strapping. It handles various size bundles without adjustment. The Model 12 takes only 7½ sq. ft. of floor space and it weighs only 1300 pounds.

The Model 12 also speeds production at Celotex. "Before we switched to automatic strapping, we handled our fiberboard bundles at least 4 times between production line and shipping dock," says Mr. F. J. Alfeis, Work Manager at the L'Anse, Michigan plant. "Since we installed the automatic USS Round Steel Strapping machine, our bundles are compactly wrapped, palletized, and moved by fork-lift truck directly to outside carriers in one simple operation."

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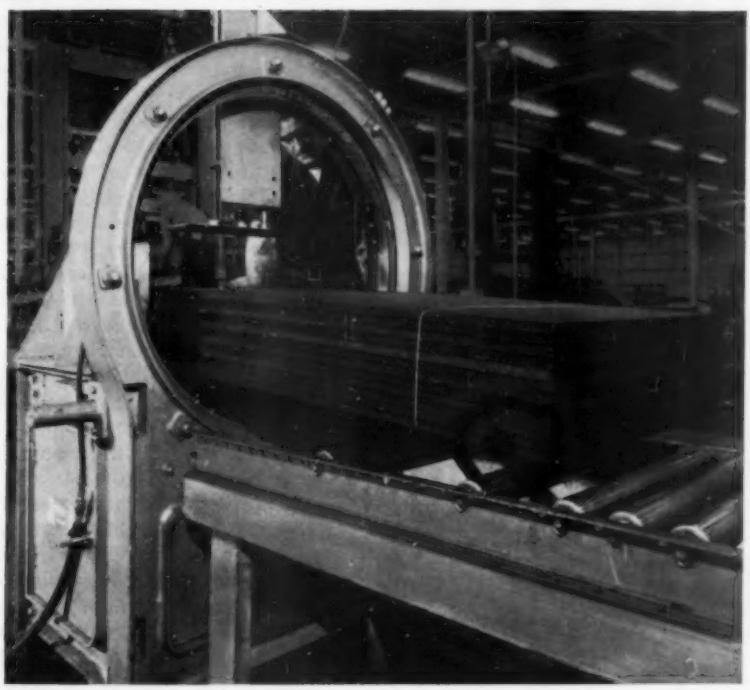

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Getting effective cost control

Real cost control is a piece of every manager's job—usually a big piece. And it can't be made effective with an occasional wild attack. It has to be done constantly, systematically, in good times and bad. Ideas like these form the basis of a helpful new how-to book on getting effective cost control.

The Cost-Minded Manager is aimed at manufacturing men, but the author has a strong personnel background. So the emphasis is on motivation—how to get people to cooperate. It's loaded with practical tips. For instance, how do you pare a "minimum" budget without doing more harm than good?

Entire chapters of the book are given to controlling labor costs, getting and staying on top of maintenance costs, how to set up a solid suggestion plan and keep it from going to sleep.

Subject matter is arranged to follow the typical management cycle—planning, action, follow-up, and evaluation. The author begins with an analysis of the basic concepts of cost control, including his view that continuous cost control is a key element of sound management. He goes on to discuss the organization of the program, and ways to sell it to the front office. Work simplification and methods improvement are well covered. These subjects are illustrated with actual case histories from several different industries.

In addition to concrete suggestions on getting, measuring, and controlling progress, the book deals at length with the human factors involved: The role of the supervisor, rewards and incentives, the development of cost-consciousness.

An entire chapter is devoted to budgets and cost data, ranging from setting and achieving cost goals to records management. Budgetary planning and controls, labor utilization and manpower forecasting, accountability, and how to use data processing are all covered. It gives the pitfalls and roadblocks and tells how to overcome them. Is there real pay dirt in paper? An example is included of a firm that got rid of nearly 75% of its records—proving that the answer is "yes."

The final chapter may be the most helpful of all. It deals with the initial steps, standards of performance, and yardsticks of progress. It tells how to gain employee acceptance, discusses the need for training, and gives the requisites for success. It's full of practical suggestions and tips that were learned the hard way.

Finally, there is an appendix of company materials and an excellent bibliography. Net result: highly recommended.

The Cost-Minded Manager, by John D. Staley. American Management Association, 1515 Broadway, New York 36. 288 pages. $6.75.

Labor relations help

Two books offer practical help on labor relations problems:

(1) *Primer of Labor Relations* is a fundamental textbook that clearly outlines the many facts of the now-complex structure of legislation, rules, regulations, and decisions in the broad field of labor relations. Included are such discussions as who is covered by labor laws, what are the rights of employees and employers subject to the law, and how may these rights be exercised without interfering with the rights of either party.

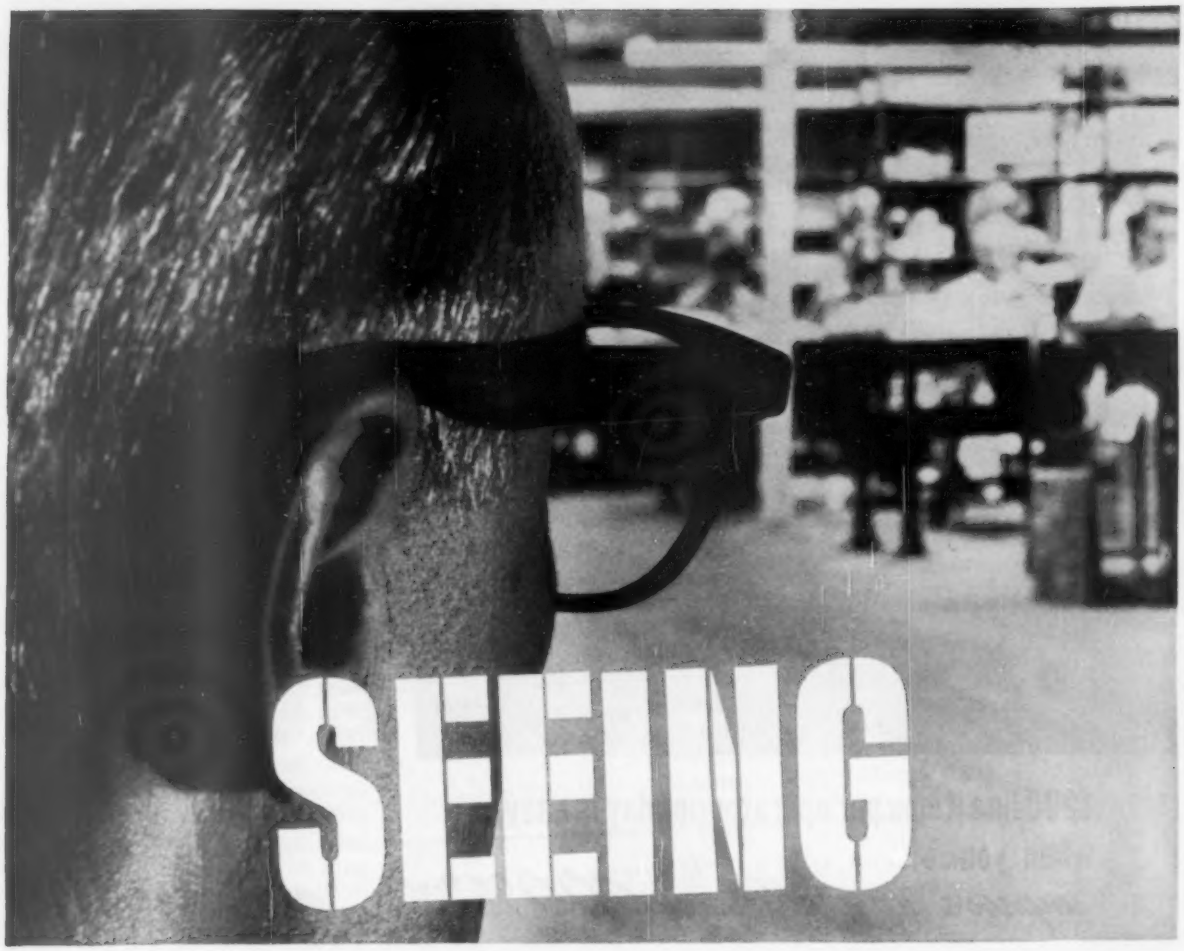
(2) *Anatomy of a Labor Arbitration* is a how-to-do-it book that shows the ins and outs of arbitration by taking the reader through a fictional case study—step-by-step. The author, a professor of law at the University of California and a permanent arbitrator for several large companies, offers informative commentary all along the way.

Primer of Labor Relations. 96 pages. $1.

Anatomy of a Labor Arbitration, by Sam Kagel. 182 pages. $5.75.

Both published by The Bureau of National Affairs, Inc., 1231 24th St., N.W., Washington 7, D.C.

Turn the page



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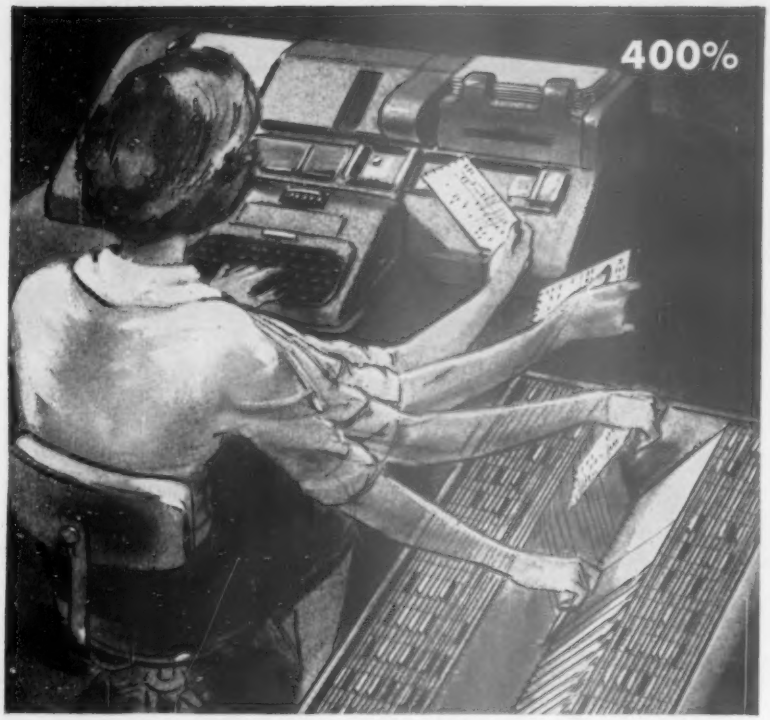

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Systems Specialists in Principal Cities

Begins on page 200

BOOKS

Supervisors in Action has a serious, intelligent core. But its approach is light-hearted. Any manager on his way up, and many who have arrived, will find it full of help on delegation, order giving, reprimands, problem employees, and the like. In a field that's overrun with contenders, this one deserves a second look.

Supervisors in Action, by Joseph J. Famularo. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. 238 pages. $4.75.

Older worker survey presents facts and data on hiring practices, personnel policies, and pension programs as related to older workers in Lehigh County, Pa. Although this report is limited to a small area, the reader will find it interesting for these two reasons: (1) It may serve as a model for those who want to survey their local areas; and (2) these data tend to correlate with data developed by FACTORY's nationwide survey of older worker personnel practices (see March 1958 issue, page 85).

Older Worker Survey. Lehigh County Community Council, 34 N. 5th St., Allentown, Pa. 133 pages. $2.

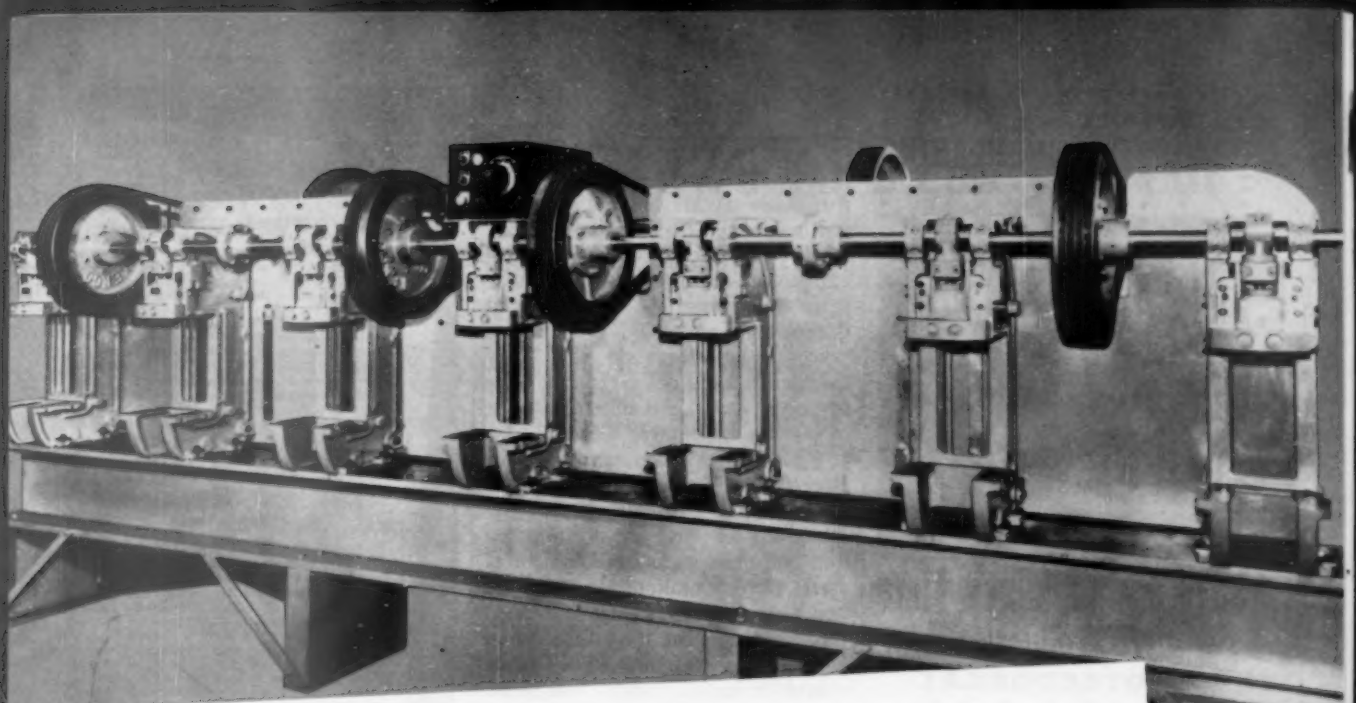
Compressed air systems, equipment, and design data are expertly packaged in this third edition of the air-user's bible. The bulk of the material is of direct interest to plant men who use and maintain compressed air for tools rather than processes. For instance, two chapters totaling 121 pages summarize the application, maintenance, and testing of almost every kind of pneumatic tool motor or handling device you've ever heard about (and probably some you haven't).

The handbook also has a 102-page general reference section containing all the authentic, essential information you need to plan, install, and evaluate compressors, systems, or tools in your plant.

Summing up: If you use air, you can't afford not to keep this reference handy.

Compressed Air and Gas Handbook (3rd Edition). Compressed Air and Gas Institute, 122 E. 42nd St., New York 17. 562 pages. $8.

For more facts Circle 536 on Reader Service Card Circle 537 on Reader Service Card for items on next page



Dayco CORPORATION

Dayton Industrial Products Co. Div. Melrose Park, Illinois

"Non-slip Dayton Cog-Belt® saves 25 to 55% of final drive cost" ...president, Kenco Mfg. Co., Los Angeles

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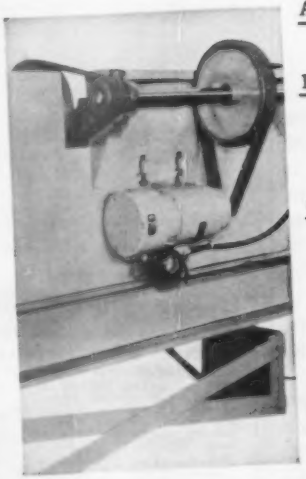

Application: Metal punch presses gang-driven by synchronous motors

Drive Conditions: Seven presses ganged on 16 ft bed operate on 1-1/2 inch stroke, 90 strokes per minute. Impact, 8 tons per press, 56 tons total.

Cog-Belt Results: On previous tests made by Kenco using 18 ton slow-speed press with 19 ton load, Cog-Belts showed 44% less slippage than other V-Belts. On 8 ton press using 1-1/2" P.D. sheave, Cog-Belts had 26% less slippage.

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Dayco Corporation, Dayton Industrial Products Co. Div., Melrose Park, Illinois

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FILMS

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Roundtable Productions, 275 S. Beverly Dr., Beverly Hills, Calif.

Rhapsody of Steel is an animated film that dramatizes development of steel. Depicts mountains of iron ore and raw materials being converted into iron and steel, then formed into products we use today. 16 or 35mm, sound, color, 23 min. For loan, write to:

United States Steel Corp., Film Distribution Center, 525 William Penn Place, Pittsburgh 30.

Down With Unit Cost has as its theme production cost control in the highly competitive national and international metalworking markets. Film stresses the fixed cost elements—machine, operator, cutting tools, downtime, maintenance, plant overhead—and points the way to increased quality production. 16mm, color, sound, 17 min. Write to:

Master Chemical Corp., 13 N. Huron St., Toledo 1, Ohio.

Space Building for Man reviews man's quest for space and the dramatic story of glass. It shows the construction of a building from its steel skeleton, and emphasizes the glazing of the four glass walls to show how daylight is brought indoors. 16mm, color, sound, 23½ min. For loan, write to:

Libby-Owens-Ford Glass Co., 811 Madison Ave., Toledo 1, Ohio.

The Challenge tells what a company did to try to help young people gain a better understanding of modern business. The film explains profit—the need for it and what is done with it—in terms of reinvestment for growth, new shapes, sharing with workers. 16mm, color, sound, 27 min. For loan, write to:

Sterling Movies, U.S.A., 375 Park Ave., New York 22.

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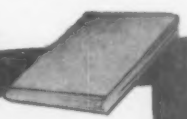

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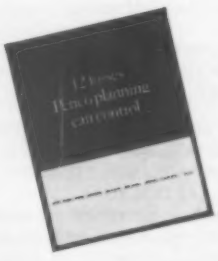

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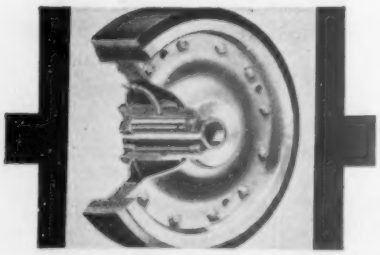

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ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, circle numbers on Reader Service Card.

BUILDING

275—Plant site. Details on plant location facilities in Toledo-Northwestern Ohio area. Toledo Edison Co.

276—Plant site. Data on manufacturers' production capacities in Northern Plains States. Northern Natural Gas Co.

277—Flooring materials. Data sheets on heavy-duty resurfacing, patching, new construction. The Flintkote Co.

278—Floor plate. Bulletin SD-S 10 describes heavy-duty floor plate that's easy to weld. Alan Wood Steel Co.

ELECTRICAL

279—Limit switch, pushbutton. Bulletins 802T, 800T. Time delay adjustable from 1-15 seconds. Allen-Bradley Co.

280—Terminal blocks. Bulletin 1492 covers snap-on types. Can have up to 29 blocks per foot. Allen-Bradley Co.

281—Precision switches. Catalog 83 on plunger and roller-arm actuator switches. Micro Switch Div., Honeywell.

282—Limit Switches. Publication ED-145-Q211 describes new line of operator options, new features. Cutler-Hammer.

283—Safety switches. Bulletin explains visible blade construction of safety switches. Photos. Square D Co.

284—Silicones. Literature tells about use of silicones for insulation of motors, transformers. Dow Corning Corp.

285—Motors. Nine bulletins cover adjustable speed drives for various applications. Louis Allis Co.

286—Contact blocks. Booklet GEA-7320 on heavy-duty oil-tight push buttons for panels. General Electric Co.

PLANT SERVICES

287—Pipe. Catalog (40 pages) has facts on welded steel pipe for many uses. Armco Drainage & Metal Products.

288—Automated food service. Here's information on automated food service by machine. Automatic Canteen Co.

289—Shelving/lockers. Booklet, "12 Losses Penco Planning Can Control," is yours on request. Alan Wood Steel Co.

290—Industrial TV. Write for copy of closed-circuit TV system-planning guide. Gives applications. Philco Corp.

291—Plant protection. This brochure tells about plant security service. Pinkerton's National Detective Agency.

292—Fire protection systems. Booklet (44 pages), "Special Hazard Fire Protection," free for asking. Grinnell Co.

293—Floor mats. Here are catalog sheets on four types of non-slip floor mats in many widths. American Mat Corp.

294—Compressors. Booklet, "Compressor Evaluation Guide," points out six key areas of judgment. Worthington Corp.

295—Pumps. Ask for booklet "How to Solve Pumping Problems" to help you handle liquids. Roper Hydraulics, Inc.

296—Dust collectors. Illustrated literature on self-contained units. 46 models to choose from. Aget Mfg. Co.

297—Air filtration. Bulletin 108A gives data on Dorex three-way filtration system. Connor Engineering Corp.

298—Steel equipment. This 100-page catalog describes and illustrates diversified line. Lyon Metal Products, Inc.

MATERIAL HANDLING

299—Steel shelving. Fact-packed catalog on rapidly assembled shelving. No bolts needed. Borroughs Mfg. Co.

300—Cranes, hoists, trolleys. Write for Crane Specifications Tablet and Bulletin 5000B. Conco Engineering Works.

301—Hoists. Catalog lists electric chain, wire rope, hand hoists, pullers, cranes. Chisholm-Moore Hoist Div.

302—Storage racks. Here's information on Air-Row head racks with only two basic parts. Equipment Mfg. Inc.

303—Lifts. Catalog describes 54 standard lift models—power or manually propelled. Crown Controls Co.

304—Walkie lifts. Circulars SA-54-100, SA-54-200, and "Trucks in Action" yours for the asking. Lewis-Shepard.

305—Storage racks. Catalog gives facts on adjustable racks with Slide-N-Lock posts. American Metal Products Co.

306—Mobile bins. Details on complete line of aluminum mobile bins for varied use. Wear-Ever Aluminum, Inc.

307—Lift trucks. Literature describes gas-operated models. Come with various tires. Automatic Transportation Co.

Turn the page

PICK YOUR IMPELLER, PICK YOUR PUMP

Of course, you never bought an impeller and then bought the pump later. But 'pick your impeller, pick your pump' is one way of suggesting you put *performance* before *standardization*.

Sure, we can give you pumps from a complete standardized line. We can, for example, show you how four basic frames are used in six different pump types and 127 different models. And we can show you one bearing that spins in 51 different sizes, or one shaft that turns in 39 sizes. So far as we know, there's no more standardized line of centrifugal pumps than this.

But we can't help reminding you that the day-to-day economy of any pump lies in its operating efficiency plus how close it comes to meeting your exact performance requirements. Only after these conditions are met does a minimum number of parts lying in your storeroom really count.

So, to you it's most important that this line of Worthington SESC pumps contains more (not less) different types of impellers than any other line. It contains open, closed and semi-open impellers. Each is available in five different materials to handle abrasive or corrosive materials, water or slurries. In fact, because of the extensive impeller selection, this line offers a 'customerized' pump selection meeting more specific performance requirements than any other line.

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For the name of your nearest Worthington distributor consult the Yellow Pages or write Worthington Corporation, Section 20-18, Harrison, New Jersey.

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Please send me a complete list of FACTORY reprints ☐.

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Begins on page 206

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, use Reader Service Card.

308—Tractor-shovels. Here's handy bulletin "Industrial Material Handling from A to Z". Frank G. Hough Co.

309—Toteboxes, trays. Need information on how to eliminate maintenance costs? Molded Fiber Glass Tray Co.

310—Trackmobile. Cartoon-type book, "Tricky the Trackmobile", describes versatile vehicle. Whiting Corp.

311—Containers. Illustrated brochure shows line of containers for various applications. G. B. Lewis Co.

312—Conveyors. Two bulletins, U.A.L.-61, M.I.A.561, describe outstanding performances. Mathews Conveyer Co.

313—Waste-refuse storage. Brochure describes system for waste concentration and haulage. Dempster Brothers.

MAINTENANCE

314—Paint. Booklet, "Color Dynamics," tells what it is, how it's used. Paint Div., Pittsburgh Plate Glass Co.

315—Lubricating equipment. Catalog lists electric, air, and other units. Alemite Div., Stewart-Warner Corp.

316—Protective coatings. Write for bulletin, "Imlar Vinyl Coatings"—it's free. E. I. du Pont de Nemours & Co.

317—Protective coatings. All about "Corlar Epoxy Chemical-Resistant Finishes." E. I. du Pont de Nemours & Co.

318—Paint. "Slide guide" contains helpful data on selection of proper paints. Barreled Sunlight Paint Co.

319—Lubricants. Lubriplate Data Book is useful treatise on lubrication. Lubriplate Div., Fiske Bros. Refining Co.

320—Oilers, cans. This catalog shows complete line. All styles and sizes for every purpose. Eagle Mfg. Co.

321—Adhesive coating. Bulletins on self-curing coating for finishing masonry walls. Three colors. Swift & Co.

322—Rust preventives. These two charts give industrial and government specifications. Valvoline Oil Co.

323—Protective coatings. Complete information on the Bitumastic family of protective coatings. Koppers Co.

Turn the page

New from Du Pont: Protective Finishes Formulated Specifically to Combat Severe Corrosive Conditions

(T.M.)

IMLAR

Vinylmastic Coatings and Vinyl Enamels

Du Pont announces a new line of chemical-resistant coatings to help you hold down spiralling maintenance costs by providing dependable, long-term protection under corrosive conditions that cause ordinary maintenance paints to fail rapidly.

Ideal for Severe Acid Conditions

IMLAR Vinylmastic Coatings and Vinyl Enamels possess extraordinary resistance to spillage, fumes and vapors from highly corrosive acids and alkalies—including sulfuric and nitric acid, sodium chloride, ammonia and lime. They also withstand persistent condensate, water immersion and salt spray, have excellent resistance to radiation decontaminating solutions, are unaffected by surface temperatures up to 150° F.

For Indoor or Outdoor Applications

Ready-mixed IMLAR coatings are recommended for field or maintenance painting of any steel or concrete surface subject to highly corrosive conditions. They can be used indoors as well as out, on buildings, structural steel, heavy machinery, bins, hoppers, tank or vat interiors and exteriors. Applied in three stages—primer, intermediate and topcoat—they dry quickly to a thick, hard, semi-gloss finish with excellent cohesion and flexibility, superior distensibility and abrasion resistance.

Relatively non-toxic, IMLAR coatings are easy to apply with conventional spraying equipment. Proper surface preparation (preferably sandblasting) is a must. Topcoats come in red or gray as well as black and white. Typical industrial applications for IMLAR include bleacheries, paper mills, chemical and petroleum plants.

For areas with severe alkali conditions, use new Du Pont CORLAR(T.M.) Epoxy Chemical-Resistant Finishes. They offer excellent resistance to chemical fumes, spills and moisture.

For recommendations concerning your own specific corrosion problems, get the expert advice of your local Du Pont Technical Representative. To reach him, call your nearest Du Pont District Sales Office, listed in your phone book. For more detailed information about these new finishes, clip and mail the coupon below.

Clip and Mail the Coupon Today for FREE Du Pont Technical Bulletin!

E. I. du Pont de Nemours & Co. (Inc.)
Finishes Division, Department F-18
Wilmington 98, Delaware

Please send me, without obligation:

☐ The Du Pont Technical Bulletin, "IMLAR Vinyl Coatings."

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REG. U. S. PAT. OFF.

IMLAR (T.M.)
Chemical-Resistant Coatings

Better Things for Better Living . . . *through Chemistry*

For more facts Circle 543 on Reader Service Card

GOODALL *Means Protection Plus Comfort . . . on Every Job!*

"LONG-LIFE" NEOPRENE LATEX APRONS . . . The splendid resistance to grease, oils and many acids, as well as water, gives "Long Life" Neoprene aprons a wide range of usefulness in many industries. Yellow or black.

"ALLGOOD" RUBBER LATEX APRONS . . . Durable, lightweight, flexible aprons, recommended for use by workers in tanneries, creameries, garages and other establishments where wet-work conditions prevail. Thoroughly latex coated, in yellow or black.

"LONG-LIFE" NEOPRENE LATEX WORK SUITS . . . The ideal work suit for men who will come in contact with oils, grease and most acids. Square-woven durable sheeting impregnated before cutting and triple-coated with neoprene latex after stitching. All seams double stitched.

"WEAR KING" *Super-Quality* BOOTS . . . Jet black smooth rubber upper, duck lined, with cushion innersole for wearing comfort. Heavy ribbed tire-tread outsole. Provides the maximum in long, comfortable service. Made in Short, Three-Quarter and Full Hip lengths, with or without "Toe-Saver" safety feature.

"GOODSEAL" *Synplastic* GLOVES . . . All-purpose gloves, with the widest possible use range. Made of a special synplastic compound that is super-resistant to acids, oils and rubber solvent chemicals, with great resistance to snagging and puncturing. Light in weight; extremely flexible. Can be furnished in either smooth or firm-grip finish.

"GOODALL" NEOPRENE PACS . . . Especially designed for any work involving chemicals, acids, oils and grease. Flexible Neoprene upper, duck lined; cushion insole; cleated Neoprene outsole. Maroon color. Plain or "Toe-Saver." 12" or 16" high, with top take-up strap.

LACE WORK SHOES . . . High-quality black rubber, net lined. "Wear-Easy" cushion insoles. Cleated, non-slip outsoles and heels. Blucher pattern and high-cut tongue prevent acids and fluids from seeping into shoes. Seven eyelet laced, six inches high. Made with plain toe or steel "Toe-Saver."

Contact Our Nearest Branch or Send for Catalog

Manufacturers of Mechanical Rubber Products—Since 1870

Standard of Quality HOSE • BELTING • FOOTWEAR
CLOTHING • EXPANSION JOINTS • PACKINGS • LINERS, ETC.

GOODALL *Rubber Company*

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

Begins on page 206

ADVERTISERS' LITERATURE

Offered in ads received up to 5th of last month for this issue. For items you want, use Reader Service Card.

PACKAGING & SHIPPING

324—Sten-C-Labls. This brochure tells how to use these labels with present addressing methods. Sten-C-Labl, Inc.

325—Weighing machines. Bulletin 2017 describes Printweigh "400"—it prints weight, time, date. Toledo Scale.

326—Packaging. You'll want folder that illustrates effective product and package identification. Markem Machine Co.

TRAINING

327—Management conferences. Information on executive and management conferences. National Education Assn.

PRODUCTION

328—Metal cleaning. Here's data on ultrasonic metal-cleaning products, services. Detrex Chemical Industries.

329—Schedule boards. Bulletin X-300 (24 pages) shows applications of visual control boards. Graphic Systems.

330—Magnetic counter. Bulletin 842 covers Series 1591 electrically actuated counters. Veeder-Root, Inc.

331—Speed reducers. Write for Book 2824 on fan-cooled worm-gear speed reducers. Three designs. Link-Belt Co.

332—Strapping machine. Complete information about automatic Model 12 strapping machine. U. S. Steel Supply Div.

333—Paint spray booth. Bulletins A-27-14 and 15 give complete details on disposable filter. Binks Mfg. Co.

334—Visible records. Booklet tells about production-planning and control panels. Acme Visible Records, Inc.

335—Air-cooled condenser. Bulletin 139-R gives facts. Capacities to thirty million BTU's. Niagara Blower Co.

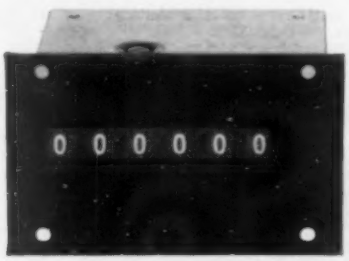
336—Hydraulic cylinders. Engineering data file on new 10,000-psi. cylinders is free. Owatonna Tool Co.

337—Air-power devices. Spot-A-Mation idea file gives complete data, wiring diagrams. Bellows-Valvair.

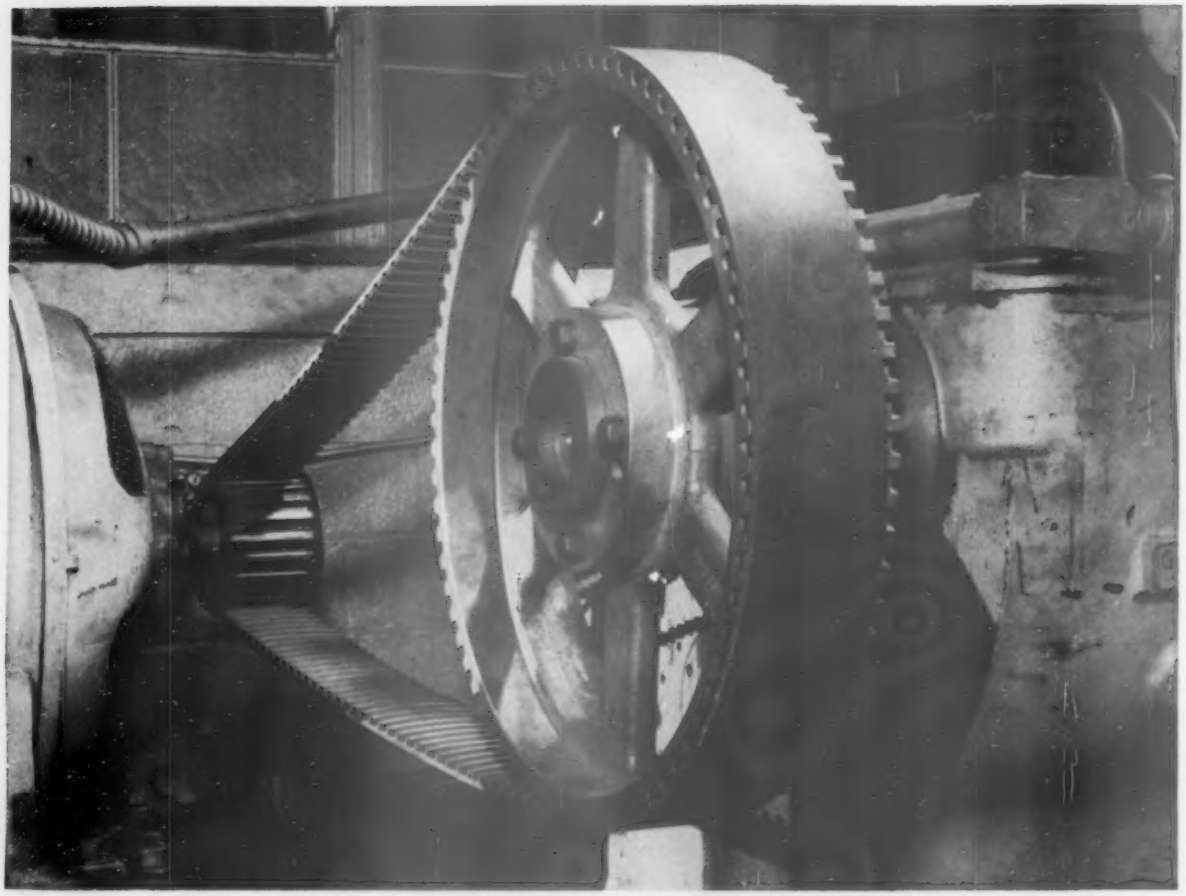
338—Speed reducers. Catalog SB-60 covers complete line. Gives ratios, reductions, etc. Philadelphia Gear Corp.

Count different sizes and weights the easy way—with a Veeder-Root High Speed Magnetic Counter. Once it was virtually impossible to record things both large or tiny, heavy or featherweight with electric counters. Nowadays, Veeder-Root magnetic counters do it at high speed and deliver remote readout data for centralized control. Design them into new machines or use them on existing equipment. You'll find them compact, reliable, simple to install. Need details? Write Electrical Section, Veeder-Root Incorporated, Hartford 2, Conn.

count on...VEEDER-ROOT



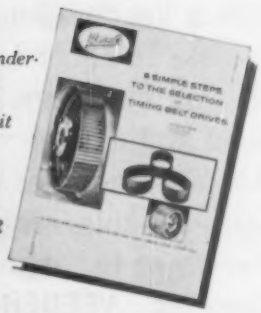
FREE — a new bulletin on Series 1591 counters. Get key facts on how these electrically actuated counters report machine output from factory to office, and how they pay off on many other devices. Send for Bulletin 842.



Here's how WOOD'S helps you with

PROBLEM-SOLVING, POSITIVE ACTION

Five, easily understood charts, developed by Wood's, permit proper drive design with almost no calculations. WRITE FOR BULLETIN 21103.



Wood's has the drive, the positive action Timing Belt Drive . . . PLUS THE EXPERIENCE it takes to give positive, workable solutions to your power transmission problems. Wood's Timing Belt Drives provide instantaneous, slip-free response . . . *full* power transmission. They require no lubrication, no motor bases, no tensioning devices. Belt matching is eliminated. And, their speed range is exceptional . . . from 0 to 16,000 fpm. Load capacities range up to 600 hp and above. Belts are unusually strong, but they are thin and flex readily, eliminating heat build-up, maintaining high operating efficiency. When you want positive action, investigate Wood's Timing Belt Drives. You'll find outstanding solutions to a wide variety of drive problems.

Wood's

T. B. WOOD'S SONS COMPANY

CHAMBERSBURG, PENNSYLVANIA

ATLANTA • CAMBRIDGE • CHICAGO • CLEVELAND • DALLAS

TD/161

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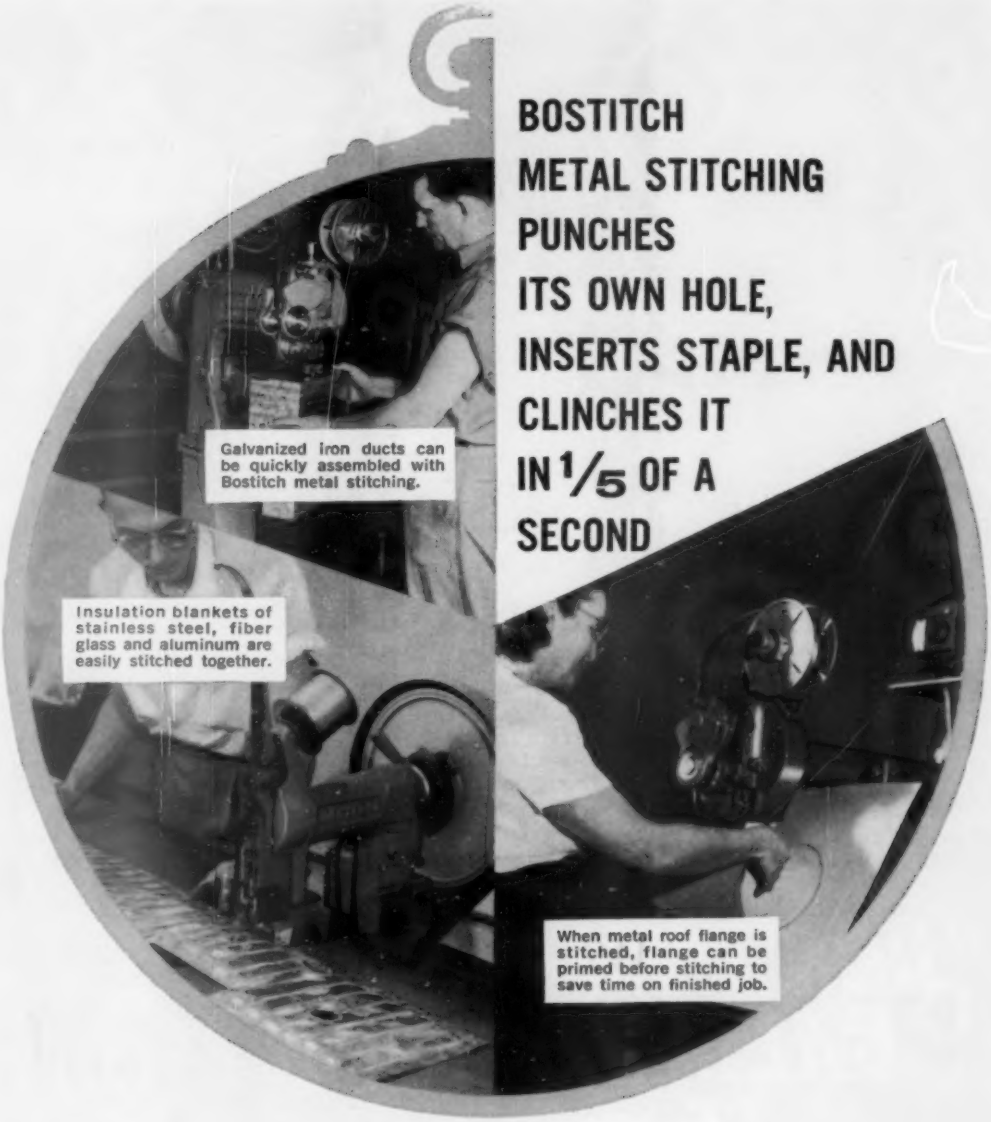
FACTORY


Galvanized iron ducts can be quickly assembled with Bostitch metal stitching.
Insulation blankets of stainless steel, fiber glass and aluminum are easily stitched together.
When metal roof flange is stitched, flange can be primed before stitching to save time on finished job.

BOSTITCH METAL STITCHING PUNCHES ITS OWN HOLE, INSERTS STAPLE, AND CLINCHES IT IN 1/5 OF A SECOND

Compare it with any other fastening method for speed, economy and security.

Compared with riveting or bolting—stitching eliminates pre-punching, pilot drilling, redrilling on assembly, matching holes, hand insertion and heading or tightening of bolts. It also eliminates back stripping in attaching rubber or fiber and some plastics to metal. Stitch is formed, driven and clinched in 1/5 of a second. Possible time savings as high as 90 per cent.

Compared with spotwelding—stitching is twice as fast. Pre-cleaning and removal of flash is unnecessary. Low heat generation causes virtually no warping—surfaces can be painted before stitching. No electrodes to clean. Mating and clamping of work is less critical. Flange distances can be reduced. Stitched parts can be disassembled safely. "Sandwich" arrangements of various metals and non-metallic materials can be stitched easily and quickly.

Compared with cementing—stitching secures positively and instantly, even though surfaces might be damp or dirty.

Compared with clips—Bostitch staples go *through* material, giving you greater holding power. Because staples *penetrate*, they hold fast.

Compare . . . you'll likely turn to Bostitch metal stitching because it is fast, economical and secure. Machine speed up to 295 stitches a minute. Holding power is adequate on almost any job where it can be used.

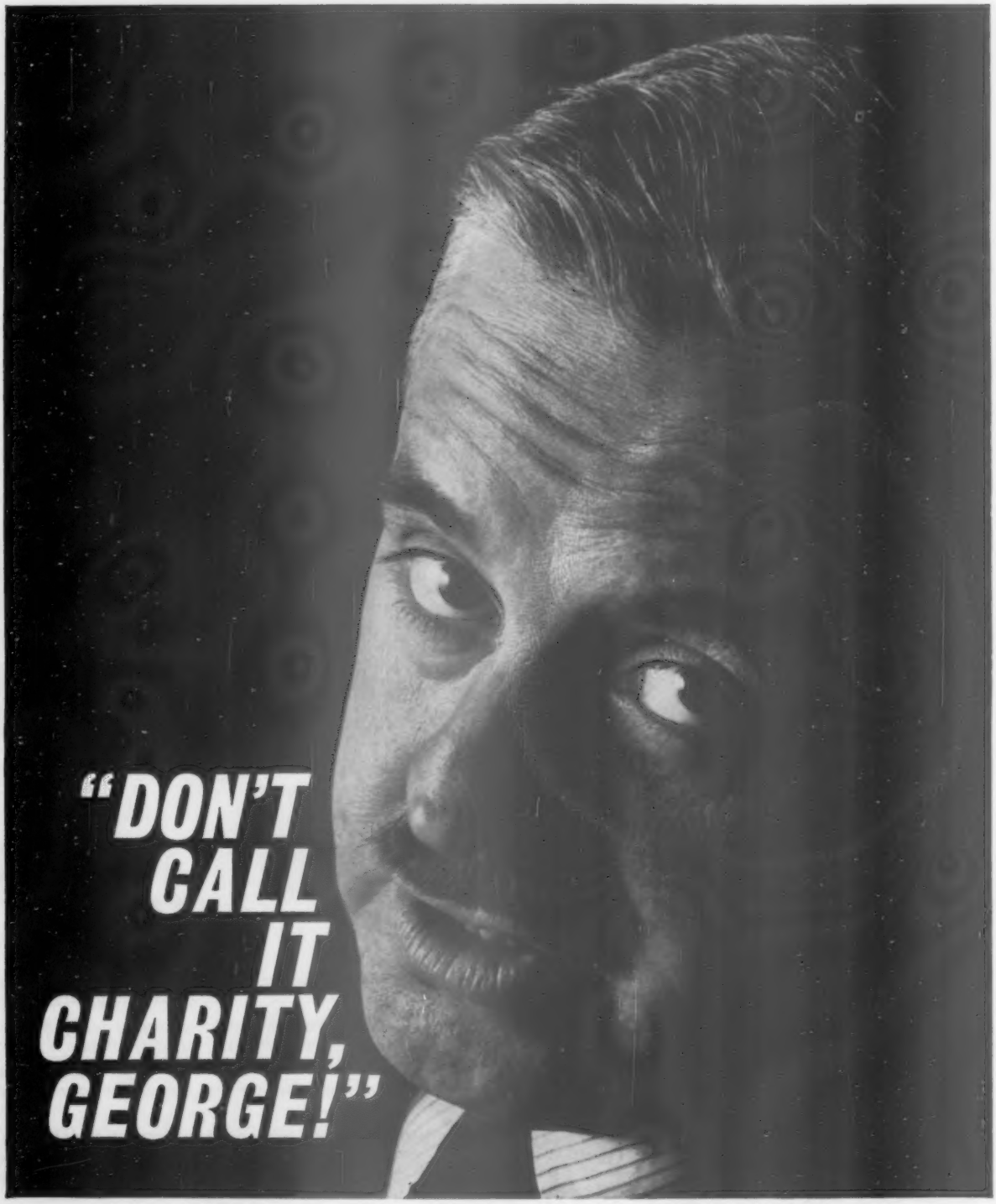
Ask your Bostitch Economy Man *now* to show you how stapling cuts manufacturing and installation costs.

Fasten it better and faster with

BOSTITCH®
STAPLERS AND STAPLES

947 BRIGGS DRIVE, EAST GREENWICH, R. I.

For more facts Circle 546 on Reader Service Card



"Contributions to the United Fund are really investments! Sure, charity takes the edge off hunger and misery. And that's necessary. But the agencies of the United Fund go way beyond that. They give the help that gets people back on their feet, makes them productive members of the community again. So it makes good sense to give the United Way—as an investment in a stronger, more prosperous community. Besides, that's the American way: to take care of our own, right at home. Our company makes a contribution, urges its employees to join in and makes it convenient through payroll payments. This once-a-year appeal cuts down the confusion of separate drives, too. It's more than a charity, George. It's an investment—and a duty—for your business and mine!" **GIVE THE UNITED WAY**

Circle 547 on Reader Service Card for items on next page

"Sure do like this new one"

It's a dandy—the new, compact, heavy-duty Gardner-Denver Model LA compressor. You just hook it up and forget it. It'll take care of your regular air needs for years, with just routine attention. Two-stage Model LB for high-pressure service. Write for Bulletin LA-1.

Gardner-Denver Company, Quincy, Illinois—Offices in principal U.S., Canadian and Mexican cities
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario
Internafional: Gardner-Denver International Division, 233 Broadway, New York 7 ,N. Y.

International Offices: Buenos Aires, Argentina; Artarmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal

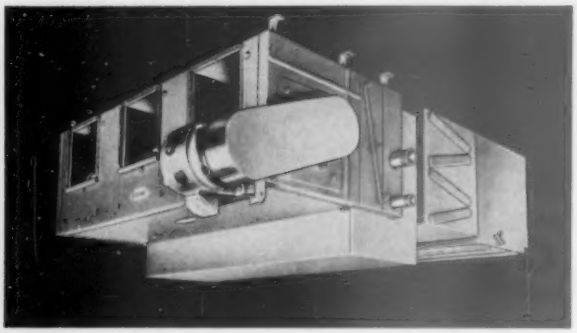
GARDNER-DENVER Since 1859

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

CARRIER HEATING AND VENTILATING UNITS

offer wide selection flexibility with substantial heating economy



Carrier 46P, Q, RV Units have heating capacities ranging from 47,000 to 2,990,000 Btu per hour, air handling capacities from 1500 to 32,000 cfm.

Widely used for heating and ventilating all types of large industrial or commercial buildings. Ideally suited for heating "make-up" air to prevent infiltration of cold air around windows and doors. By maintaining positive building pressures, they effect appreciable savings in operating costs. Other advantages:

❶ A complete choice of steam or hot water coils, available for each of seven basic unit sizes, makes it practical and economical to match heating capacity to individual job needs.

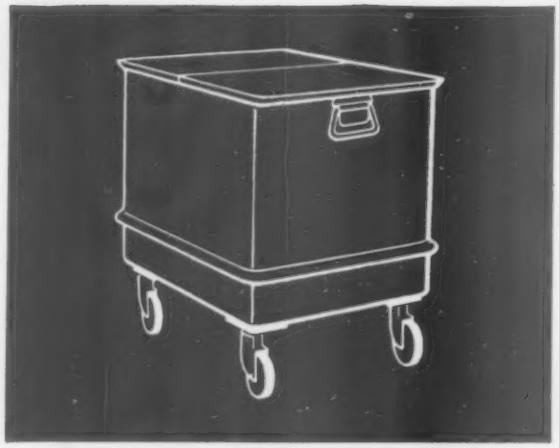
❷ Fan sections, complete with V-belt drives and multiple discharge outlets, permit a range of air handling capacities and discharge arrangements.

❸ Fan assemblies, designed to run well below their critical speeds, operate smoothly and quietly —either as free discharge units or with ducts.

❹ Carrier units also provide for extreme flexibility in the selection of controls and matching accessories. Base units arrive at job site factory-assembled, the accessories individually crated, for easy handling and installation.

For complete information, write for Catalog 46P,Q,RVIII, or call your Carrier representative listed in the Classified Directory under "Heaters—Unit." Other products in the complete Carrier heating line include Unit Heaters for steam and hot water; Gas-Fired Unit Heaters and Gas-Fired Duct Furnaces. Carrier Air Conditioning Company, Syracuse 1, N.Y.

Carrier *Air Conditioning Company*

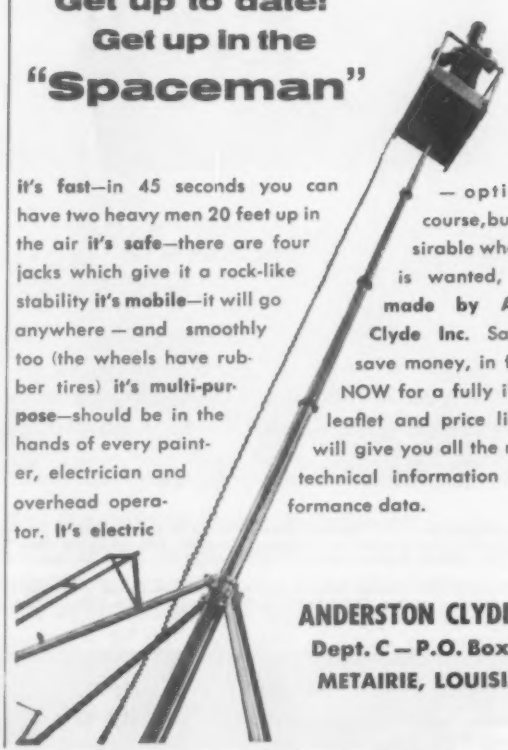


Let wear-ever keep it handy

Save amazing amounts of time. Keep parts or material at workers' finger tips in Wear-Ever mobile bins. Round, square—27-, 30-, 38- and 50-gallon capacity—all made of tough, nonsparking aluminum alloy. No seams or crevices to collect dirt (or small parts). Hard rubber wheels or casters for long wear. Send reply card for full details; or write Wear-Ever Aluminum, Inc., New Kensington, Pa. Immediate shipment from stock.

For more facts Circle 549 on Reader Service Card

Get up to date! Get up in the "Spaceman"



it's **fast**—in 45 seconds you can have two heavy men 20 feet up in the air **it's safe**—there are four jacks which give it a rock-like stability **it's mobile**—it will go anywhere — and smoothly too (the wheels have rubber tires) **it's multi-purpose**—should be in the hands of every painter, electrician and overhead operator. **It's electric** — optional of course, but most desirable where speed is wanted, and **it's made by Anderston Clyde Inc.** Save time, save money, in fact write NOW for a fully illustrated leaflet and price list, which will give you all the necessary technical information and performance data.

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METAIRIE, LOUISIANA

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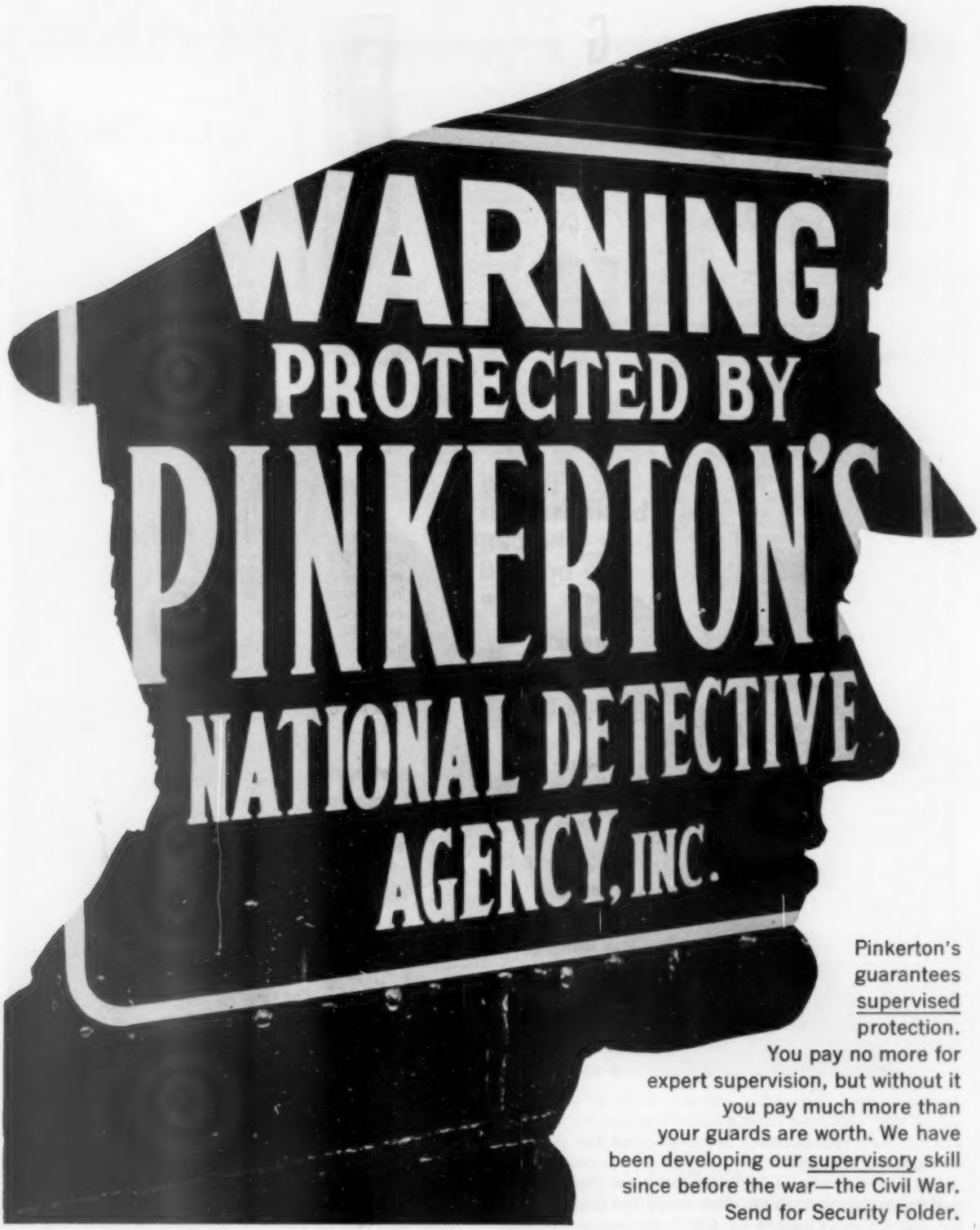
For more facts Circle 550 on Reader Service Card



Pinkerton's guarantees supervised protection. You pay no more for expert supervision, but without it you pay much more than your guards are worth. We have been developing our supervisory skill since before the war—the Civil War. Send for Security Folder.

PINKERTON'S NATIONAL DETECTIVE AGENCY, INC.

PINKERTON'S OF CANADA LTD.

100 Church Street, New York 7, N.Y. • 47 offices from coast to coast

Exclusive supplier of all security services, New York World's Fair, 1964-65

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For more facts Circle 551 on Reader Service Card

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But how? And where? These key questions are answered best by marketing research, often costly and time-consuming. But it doesn't have to be. And it isn't—if you consult your U. S. Department of Commerce. On file, it has a 135-million-dollar fund of marketing data—vital and valuable up-to-date facts. Yours for the asking.

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Take advantage of the many ways in which your business can grow. In new U. S. markets. In foreign markets. In developing new products and services. In attracting new industry to your community. Just write or phone the U. S. Department of Commerce Office of Field Services in your city, or Washington 25, D. C. Your U. S. Department of Commerce is always ready to help you grow with America!

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(Classified Advertising)

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Positions Wanted take one-half of above rate.
Box Numbers in care of our New York, Chicago & San Francisco offices count as one additional line.
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Professor of Industrial Engineering, Ph.D. degree. Teaching and Industrial experience required. Operations Research specialization preferred. Salary appropriate to qualifications. Department of Industrial Engineering, Syracuse University, Syracuse 10, New York.

Chief Engineer, experienced in designing turbo blower, industrial vacuum cleaner and pneumatic conveying systems. To head up new sales division. Reply P-7124, Factory.

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Sales Representative, excellent background equipment sales, graduate, S. E. area. PW-7102, Factory

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Time Study Boards with transparent watch holders, stop watches, Pedometers, Slide Rules. Forms in stock. Sample Kit Free. Oxnam Products Co., 5544 S. Homan Ave., Chicago 29.

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TO EMPLOYERS
TO EMPLOYEES

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MR. EMPLOYER, won't you remove the mystery about the status of an employee's application by acknowledging all applicants and not just the promising candidates.
MR. EMPLOYEE you, too, can help by acknowledging applications and job offers. This would encourage more companies to answer position wanted ads in this section. We make this suggestion in a spirit of helpful cooperation between employers and employees. This section will be the more useful to all as a result of this consideration.

Classified Advertising Division
McGraw-Hill Publishing Co., Inc.
330 West 42nd St., New York 36, N. Y.

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B.S. Degree in Mining, Mechanical or Industrial Engineering essential. M.S. Degree advantageous.

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Requires 10 years experience in Industrial Engineering, including 5 years in a supervisory position. Experience must cover Industrial Engineering techniques such as time and motion study, ratio delay, methods engineering, wage incentives, cost accounting, labor relations, job evaluation.

Excellent opportunity—large copper company central Chilean area.

Employment on contract basis in multiples of 2 years home leave vacation of 2 months at the end of 2 year contract. Transportation both ways and salary while traveling paid by Company. Provision also made to transport household effects.

In reply give complete details and references.

P6696 Factory
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P&H O.E.T. Crane 150 ton 71' span with 50 ton auxiliary hoist
Niles O.E.T. Crane 50 ton 71' span with 10 ton auxiliary hoist
Morgan O.E.T. Crane 20 ton 34' span with 5 ton auxiliary hoist
Morgan O.E.T. Crane 20 ton 47' span with 4 ton auxiliary hoist
Shaw O.E.T. Crane 3 ton 41' span

Any reasonable offer will be considered.

For complete details, write
R. K. Stevenson, The Beckett Paper Company,
4th & Dayton Streets, Hamilton, Ohio.

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A major paper convertor wants a mechanical engineer with experience in the design, operation and maintenance of automatic packaging machinery. This is a responsible position at management level. Replies held confidential. Salary is open.

P 7131 Factory
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

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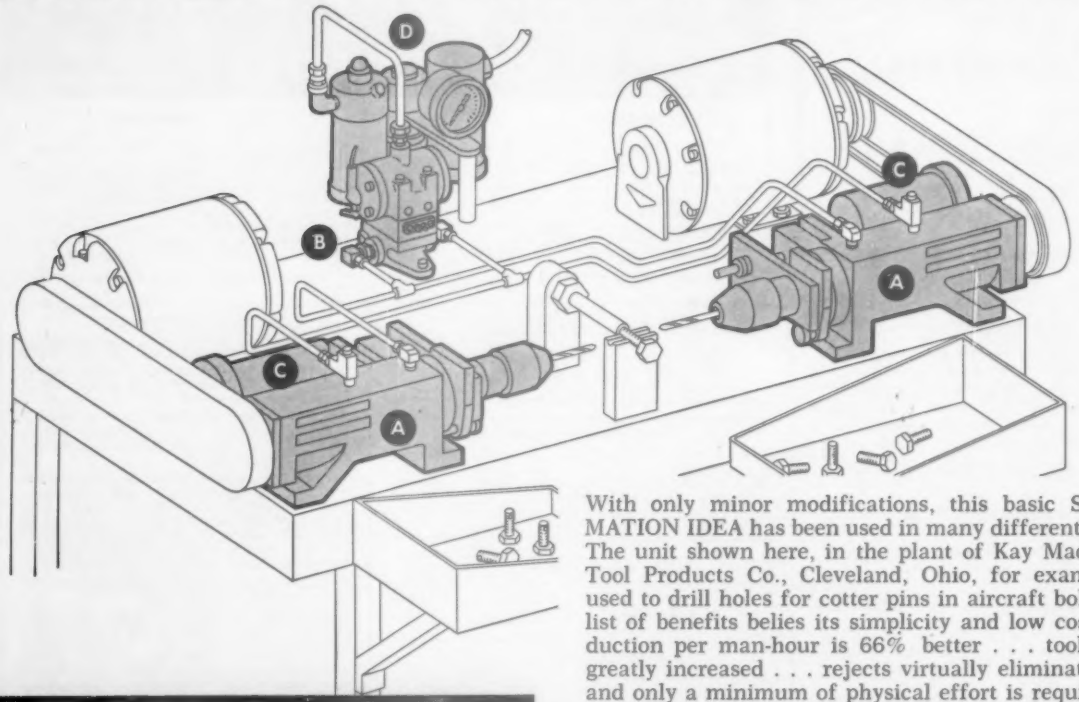
YOUR OWN MEN CAN BUILD THIS PRECISION MACHINE FOR CUTTING COSTS IN DRILLING METALS, PLASTICS AND WOOD



With only minor modifications, this basic SPOT-A-MATION IDEA has been used in many different plants. The unit shown here, in the plant of Kay Machine & Tool Products Co., Cleveland, Ohio, for example, is used to drill holes for cotter pins in aircraft bolts. The list of benefits belies its simplicity and low cost: production per man-hour is 66% better . . . tool life is greatly increased . . . rejects virtually eliminated . . . and only a minimum of physical effort is required for what formerly was a very fatiguing operation.

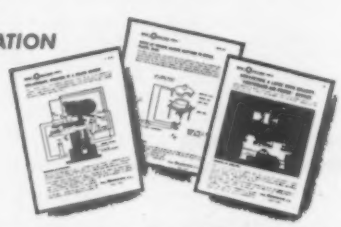
The machine is built around two compact interlocked Bellows-Locke Model 22A Drill Units — air operated, hydraulically controlled — mounted horizontally in opposed positions. Automatic feeding, positioning and ejection could be incorporated easily by the addition of other Bellows "Controlled-Air-Power" Devices. This SPOT-A-MATION IDEA can be readily adapted to perform a wide range of other operations, such as punching, forming, riveting, crimping, etc., by using such other Bellows work units as The Bellows Air Motor® in place of the Drill units.

This machine is typical of the ways cost-conscious men the world over are using Bellows "Controlled-Air-Power" Devices to secure faster, better, lower-cost production. Opportunities exist in your plant, too. Why not investigate — *today!*

As shown in the photo above and "keyed" in the drawing, this shop-built drilling machine consists essentially of two low-cost, air-operated Bellows-Locke Model 22A Drill Units (A), a Bellows Electroaire® operating control valve (B), two Bellows Hydro-Checks® which provide smooth precision operation (C) and a Bellows Lubri-Air® Control Unit which cleans, regulates and lubricates the air supply (D). Not visible is the foot-operated control pedal.

697C-3

THIS "SPOT-A-MATION IDEA" FILE IS YOURS ON REQUEST



Contains installation data, wiring diagrams and equipment lists for the "Spot-A-Mation" idea sketched above, as well as for scores of similar ideas you can use. Write Dept. FA-861, Bellows-Valvair, Akron 9, Ohio.

Bellows-Valvair

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Index To Advertisements

Acme Steel Company 14, 15
Acme Visible Records, Inc. 194
Aget Manufacturing Co. 138
Alan Wood Steel Company 103
Penco Division 205
Alemite Division, Stewart-Warner Corp. 101
Allen-Bradley Company 37, 38
Allis-Chalmers 181, 183
Allis Co., Louis 22, 23
American Air Filter Company .. 132, 133
American Mat Corporation 128
American Metal Products Co. 158
American Mutual Liability Insurance Co. 46, 47
American Standard, Controls Div. 126, 127
American Oil Company 115
Anderston-Clyde, Inc. 216
Armco Drainage & Metal Products, Inc. 51
Arno Adhesive Tapes, Inc. 121
Aro Equipment Corporation 20
Automatic Canteen Company of America 189
Automatic Transportation Company 167

Barreled Sunlight Paint Co. 201
Bellows-Valvair 220
Bessemer & Lake Erie Railroad Co. 130
Binks Manufacturing Company 108
Borroughs Manufacturing Co. 124
Bostitch 213
Buffalo Forge Company 185

Carrier Air Conditioning Co. 53, 216
Caterpillar Tractor Company 157
Champion Lamp Works 122
Chisholm-Moore Hoist Division, Columbus McKinnon Corp. 184
Champion Pneumatic Machinery Co. 200
Cleco, Div. of Reed Roller Bit 222
Cleveland Tramrail Div., Cleveland Crane & Engineering Co. 24
Conco Engineering Works, Inc. 169
Connor Engineering Corporation 166
Crown Controls Co., Inc. 164
Cutler-Hammer, Inc. 26, 27

Darnell Corporation, Ltd. 206
Dayton Industrial Products Co., Division of Dayco Corporation 203
Dempster Brothers 136
Dennison Manufacturing Co 187
Detrex Chemical Industries, Inc. 106
DeVilbiss Company ..... Second Cover
Dodge Manufacturing Corporation 104, 105
Dow Corning Corporation 11
duPont de Nemours & Co. (Inc.) E. I. 209

Eagle Manufacturing Co. 5
Eastman Kodak Company 179
Electric Storage Battery Co. 30
Elliott Company 50
Esterline Angus Instrument Co., Inc 99
Equipment Mfg., Inc. 45

Factory 208
Fairbanks, Morse & Co., Scale Div. 36
Faultless Caster Corporation 8
Federal-Mogul Service Div., Federal-Mogul-Bower-Bearings, Inc. 54
Felters Company 186
Flintkote Company 121

Gardner-Denver Company 215
General Dynamics/Electronics 9
General Electric Company 44
Lamp Department 17
Computer Department 32, 33
Goodall Rubber Company 210
Goodrich Industrial Products Co., B. F. 1
Graphic Systems 198
Grinnell Company 16
Gunk Laboratories, Inc. 138

Hollywood, Fla., Chamber of Commerce 188
Hough Company, Frank G. 10
Hyster Company 176

Industrial Distributors (Sales), Ltd. 12, 13
Ingersoll-Rand 125
International Business Machines 112, 113

Jenkins Bros. 139
Johns-Manville 52
Johnson Service Company 161

Kalamazoo Tank & Silo Co. 182
Kentucky, Department of Economic Development 118
Kidde & Co., Inc., Walter 173
Koppers Company 25

LeRoi Division, Westinghouse Airbrake Co. 175
Lewis Company, G. B. 160
Lewis-Shepard 116
Link-Belt Company 31
Lubriplate Div., Fiske Bros. Refining Co. 6
Lyon Metal Products, Inc. 135

Magnetics, Inc. 119
McGraw-Hill Book Company 204
Markem Machine Co. 195
Master Builders Co. 39
Mathews Conveyer Company 114
Micro Switch, A Division of Honeywell 154
Mobil Oil Company 18, 19
Molded Fiber Glass Tray Co. 172
Motorola Communication & Electronics, Inc. 109

National Education Association 159
National Supply Division, Armco Steel Corp. 197
Newark Brush Company 168
Niagara Blower Company 180
Nordson Corporation 128
Northern Natural Gas Co. 198

OPW-Jordan Corporation 219
Otis Elevator Company 28, 29
Owatonna Tool Company 110

Philadelphia Gear Corporation 7
Pinkerton's National Detective Agency, Inc. 217
Pittsburgh Chemical Co. 21
Pittsburgh Corning Corporation 162, 163
Pittsburgh Plate Glass Co., Paint Division 107
Powell Company, Wm. 59
Prime Mover Co. 194
Protectoseal Company 204

Ramset Fastening System, Winchester-Western Div. Olin. .. 140
Ridge Tool Company 131
Rockwell Manufacturing Co. 48, 49
Rollway Bearing Co., Inc. 117
Rome Cable, Div. of Alcoa 137
Roper Hydraulics, Inc. 121
Roy & Son Company, B. S. 174

Schrader's Son, A. 120
Shell Oil Company 129
SKF Industries, Inc. 60
Square D Company .... 165, Third Cover
Sten-C-Labl, Inc. 188
Stran-Steel Corporation 111
Sun Oil Company 34, 35
Swift & Company 198

Texaco, Inc. 153
Toledo Edison Company 174
Toledo Scale Corporation 170

U. S. Rubber, Mechanical Goods Division 40, 41
U. S. Steel Supply, Div. of U. S. Steel Corp. 199

Valdura Paint Div., American-Marietta Co. 180
Valley Electric Corporation 188
Valvoline Oil Company 196
Veeder Root Inc. 211
VISIrecord, Inc. 202

Wear-Ever Aluminum, Inc. 216
Westinghouse Electric Corporation, Sturtevant Division 177
Wheeling Steel Corporation 42, 43
Whiting Corporation 123
Wood's Sons Co., T. B. 212
Worthington Corporation 193, 207, Fourth Cover

Yale & Towne Mfg. Co. 171

Industrial Consultants 219

■

SEARCHLIGHT SECTION
(Classified Advertising)
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■

Employment Opportunities 219
EQUIPMENT (Used or Surplus New) For Sale 219
Special Services 219

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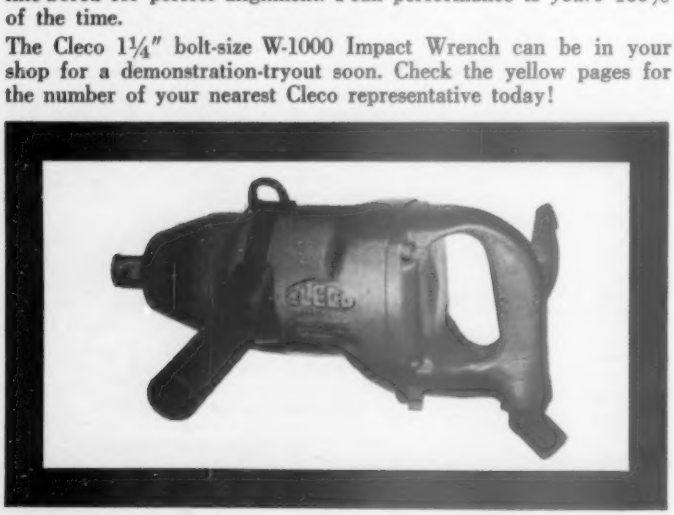

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CATALOGS —	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	78	79	80	81	82	83	84	85	86	87
EQUIPMENT —		88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106						
107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128					
129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150					
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172					
173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194					
MATERIALS —		195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213						
214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235					
IDEAS OF THE MONTH —		236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252								
253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274					
ADVERTISERS' LITERATURE —		275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290									
291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312					
313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334					
335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356					
357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378					
ADVERTISEMENTS —		404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421							
422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443					
444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465					
466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487					
488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509					
510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531					
532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553					
554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575					
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597					
598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619					
620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641					
642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663					
664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	77	999					

NAME..... TITLE.....

Card Good Only Through November 1961

COMPANY..... August 1961-2

CITY AND STATE

STREET.....

CATALOGS —	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	78	79	80	81	82	83	84	85	86	87
EQUIPMENT —		88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106						
107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128					
129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150					
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172					
173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194					
MATERIALS —		195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213						
214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235					
IDEAS OF THE MONTH —		236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252								
253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274					
ADVERTISERS' LITERATURE —		275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290									
291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312					
313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334					
335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356					
357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378					
ADVERTISEMENTS —		404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421							
422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443					
444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465					
466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487					
488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509					
510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531					
532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553					
554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575					
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597					
598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619					
620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641					
642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663					
664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	77	999					

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COMPANY..... August 1961-1

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14—Roof ventilators
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16—Flooded-bed scrubber
17—Pumps

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22—Flexible metal hose
23—Tube fittings

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26—Pulleys
27—Weighing systems
28—Conveyors
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38—Hard-facing electrodes, wires
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40—Safety belts
41—Dust separator
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45—Dust arresters

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47—Ball bearings
48—Connecting, sealing
49—Clutch, brake

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51—Flat finishers
52—Pressure blasting
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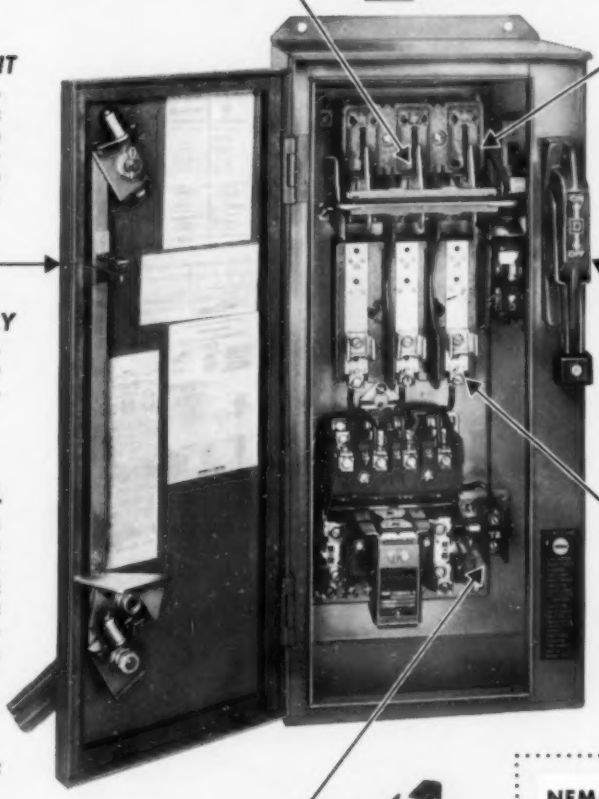
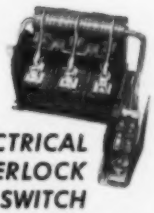
THE SAFEST, MOST RELIABLE COMBINATION STARTER

VISIBLE BLADES You can see the switch is open and know you're safe!





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DOOR CLOSES SIMPLY and EASILY

No cover bolts to secure—just push door shut and turn door handle to close and seal.

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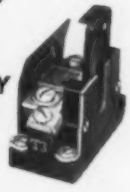

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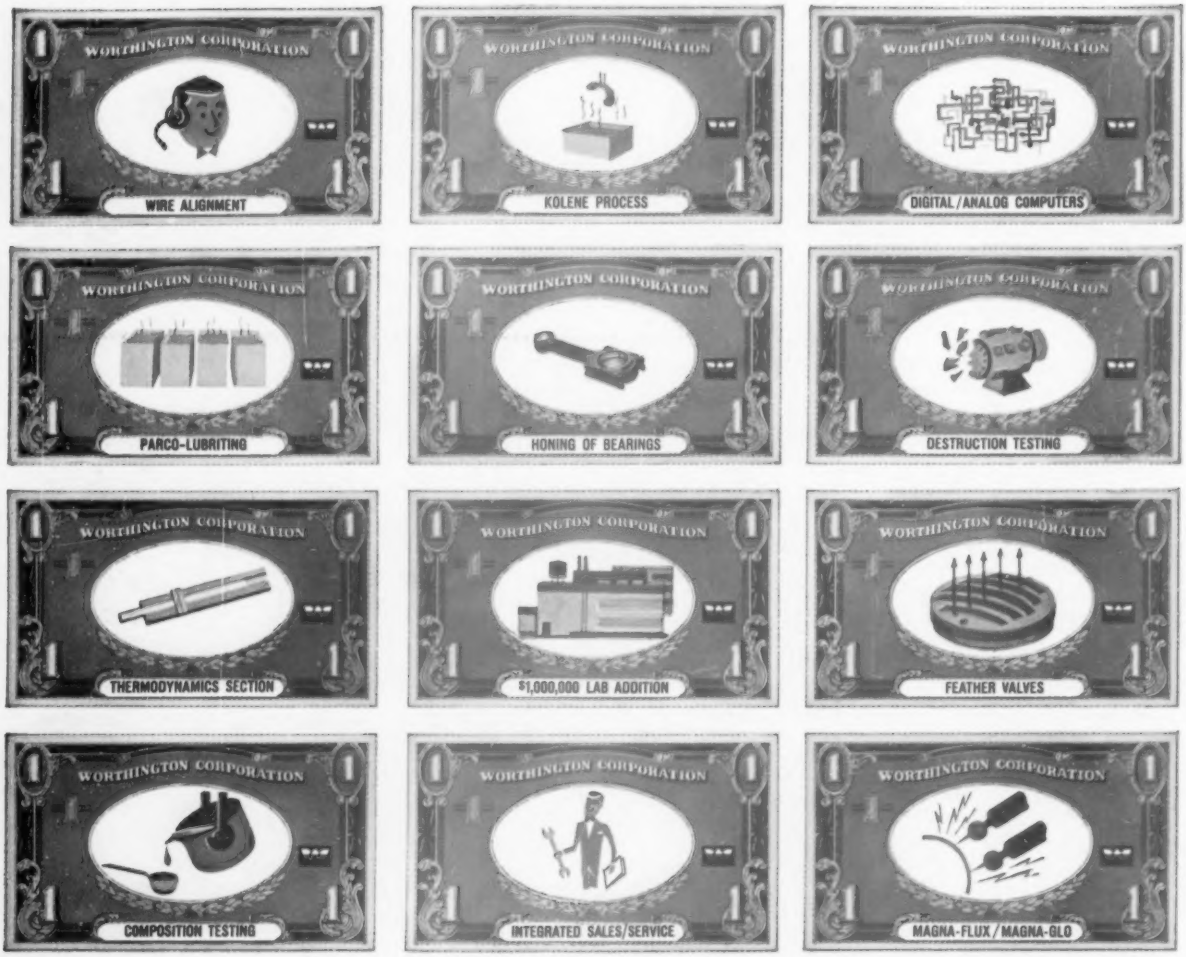
COMPRESSOR DOLLARS



WHAT'S IN THE PRICE?

These are dollars that are paid out every day for Worthington compressors. They reveal a few of the extra or "hidden values" that make the compressors worth most for the dollars invested. But even more important, they give a clue about real compressor values.

Today, rising costs and minimum profits compel every buyer to scrutinize compressor dollars more closely—to make sure they contain a full measure of value. In fact, your problem in determining the true value of a quotation is more difficult —but more important—than ever before.

What do we suggest? You must, of course, evaluate the price—dig for the "hidden values" buried in each manufacturer's offering with increased diligence. You can be sure that the values of prices will separate very quickly, because "hidden values" vary sharply in the compressor market today.

To help you isolate and evaluate competitive compressor offerings, we have prepared an objective "Compressor Evaluation Guide." This booklet points out the six key areas of judgment required for compressor evaluation and details them in full. Ask your Worthington Representative for this booklet or write Worthington Corporation, Dept. 36-18, Clinton Street and Roberts Avenue, Buffalo, N. Y. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.

WORTHINGTON

PRODUCTS THAT WORK FOR YOUR PROFIT

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